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PRACTICAL PHARMACY

FOR

MEDICAL STUDENTS.

Specially adapted for the Examination in Practical
Pharmacy of the Conjoint Board.

BY

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LONDON :
BAILLIÈRE, TINDALL & COX,
20, KING WILLIAM STREET, STRAND.
1893.

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PREFACE.

THIS little volume is in no way intended to replace any of the existing works on *Materia Medica*. It is designed as a practical companion to the medical student in his study of the physical characters of drugs, and as a reference book in his dispensing. The author believes that in fulfilling these purposes it will supply a new want amongst students.

The book contains all the information it is necessary for a student to possess, who presents himself for the examination in 'Practical Pharmacy' of the Conjoint Board.

The arrangement of the first part of the book is alphabetical, of the second, that of the examination schedule.

The directions for dispensing each drug and the list of its incompatibles are unusually copious. These features, and the characters and recognition of the drugs, are the chief new points of the work.

A. C. S.

ST. GEORGE'S HOSPITAL, W.

SYLLABUS OF THE EXAMINATION IN 'PRACTICAL PHARMACY' OF THE CON- JOINT EXAMINING BOARD OF PHYSI- CIANS AND SURGEONS IN ENGLAND.

This Synopsis is applicable to all Candidates who registered as Medical Students on or after the 1st January, 1892.

PRACTICAL PHARMACY.

- a. The general nature and composition, and the most important physical and chemical characters, of the Pharmacopœial drugs named in the annexed Schedule.
- b. The composition of the Pharmacopœial preparations of these drugs, and the processes employed in making them.
- c. The doses of these drugs and of their preparations.
- d. The Candidate will be required to recognise the drugs indicated *by italics* in the annexed Schedule.

SCHEDULE OF DRUGS.

Acidum Aceticum; Acidum Boricum; Acidum Citricum; Acidum Hydrochloricum; *Acidum Hydrocyanicum Dilutum*; Acidum Nitricum; Acidum Nitro - hydrochloricum; Acidum Sulphuricum; Acidum Sulphurosum; Acidum Tartaricum.

Alumen; *Alumen Exsiccatum*.

Ammonii Carbonas; *Ammonii Chloridum*; *Liquor Ammonii Fortior*; *Liquor Ammonii Acetatis*.

Antimonium Tartaratum.

Argenti Nitras.

Acidum Arseniosum; *Arsenii Iodidum*; *Ferri Arsenias*; *Sodii Arsenias*; *Bismuthi Carbonas*; *Bismuthi Citras*; *Liquor Bismuthi et Ammonii Citratis*; *Bismuthi Subnitratis*.

Bromum; *Ammonii Bromidum*; *Potassii Bromidum*; *Sodii Bromidum*.

Calx; *Calcii Hydras*; *Calcii Carbonas Præcipitata*; *Creta Præparata*.

Liquor Chlori; *Calx Chlorinata*; *Liquor Sodæ Chlorinatæ*.

Cupri Sulphas.

Ferrum; *Ferrum Redactum*; *Ferri Sulphas*; *Ferri Sulphas Granulata*; *Ferri Carbonas Saccharata*; *Liquor Ferri Acetatis Fortior*; *Liquor Ferri Perchloridi Fortior*; *Liquor Ferri Pernitratis*; *Liquor Ferri Persulphatis*; *Liquor Ferri Dialysatus*; *Ferri Peroxidum Hydratum*; *Ferri et Ammonii Citras*; *Ferrum Tartaratum*; *Ferri et Quininæ Citras*; *Pilula Ferri Iodidi*; *Syrupus Ferri Iodidi*; *Syrupus Ferri Subchloridi*.

Alcohol Ethylicum; *Spiritus Rectificatus*; *Spiritus Tenuior*; *Æther*; *Chloroformum*; *Iodoformum*.

Chloral Hydras; *Paraldehydum*; *Butyl Chloral Hydras*; *Sulphonal*.

Amyl Nitris; *Nitroglycerinum*; *Spiritus Ætheris Nitrosi*.

Acetanilidum; *Phenacetinum*; *Phenazonum*.

Collodium.

Acidum Carbolicum; *Acidum Carbolicum Liquefactum*.

Acidum Salicylicum; *Sodii Salicylas*.

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Aconiti Radix; *Aconitina*; *Aconiti Folia*.

Opium; *Morphina*; *Morphinæ Hydrochloras*; *Morphinæ Acetas*; *Morphinæ Sulphas*; *Liquor Morphinæ Bimeconatis*; *Apomorphinæ Hydrochloras*; *Codeina*.

Coca; *Cocainæ Hydrochloras*.

Jaborandi; *Pilocarpinæ Nitras*.

Quassia Lignum; *Calumbæ Radix*; *Gentianæ Radix*.

Physostigmatis Semen; *Physostigmina*.

Caffeina; *Caffeinæ Citras*.

Conii Fructus et Folia.

Asafætida; *Ammoniacum*; *Myrrha*; *Guaiaci Resina*.

Cinchonæ Cortex; *Cinchonæ Rubræ Cortex*;

Quininæ Sulphas; *Quininæ Hydrochloras*.

Salicinum.

Ipecacuanha; *Senegæ Radix*.

Glycerinum.

Nux Vomica; *Strychnina*.

Belladonnæ Radix et Folia; *Atropina*; *Atropinæ Sulphas*; *Homatropinæ Hydrobromas*; *Hyoscyami Folia*; *Stramonii Semina et Folia*.

Cannabis Indica.

Digitalis Folia; *Strophanthus*; *Scilla*.

Oleum Ricini; *Oleum Crotonis*; *Aloe Barbadosensis*; *Aloe Socotrina*; *Aloin*; *Rhamni Purshiani Cortex*; *Colocynthis Pulpa*; *Elaterium*; *Elaeterinum*; *Jalapa*; *Resina Jalapæ*; *Podophylli Rhizoma*; *Podophylli Resina*; *Rhei Radix*; *Senna Alexandrina et Indica*; *Camphora*; *Oleum Terebinthinæ*; *Resina*.

Benzoinum; *Acidum Benzoicum*; *Ammonii Benzoas*; *Sodii Benzoas*.

Acidum Tannicum; *Acidum Gallicum*; *Gallæ*; *Kino*; *Catechu*; *Hamamelidis Cortex et Folia*.

Copaiba. *Cubeba*.

Colchici Cormus et Semina.

Filix Mas. Santoninum.

Ergota.

Oleum Morrhuæ.

Cantharis.

Hydrargyrum; Hydrargyri Oxidum Flavum, Hydrargyri Oxidum Rubrum; Hydrargyri Subchloridum; Hydrargyri Perchloridum; Hydrargyrum Ammoniatum; Hydrargyri Iodidi Rubrum; Liquor Hydrargyri Nitratis Acidus.

Iodum; Potassii Iodidum; Sodii Iodidi; Plumbi Iodidum.

Magnesii Sulphas; Magnesii Carbonas; Magnesia.

Phosphorus: Acidum Phosphoricum Concentratum; Calcii Phosphas; Ferri Phosphas; Sodii Phosphas; Calcii Hypophosphis; Sodii Hypophosphis.

Plumbi Oxidum; Plumbi Acetas; Liquor Plumbi Acetatis.

Potassii Bicarbonas; Potassii Chloras; Potassa Caustica; Liquor Potassæ; Potassii Sulphas; Potassii Tartras Acida; Potassii Permanganas.

Sodii Bicarbonas; Sodæ Biboras; Sodii Nitris; Sodii Sulphas; Soda Caustica; Liquor Sodæ.

Sulphur Sublimatum; Sulphur Præcipitatum; Calx Sulphurata; Potassa Sulphurata.

Zinci Chloridum; Zinci Oxidum; Zinci Sulphas.

'PRACTICAL PHARMACY' FOR MEDICAL STUDENTS.



INTRODUCTION.

The 'British Pharmacopœia.'

THIS is a volume published, from time to time, by direction of the General Council of Medical Education and Registration of the United Kingdom. It contains a list of approved drugs and preparations, with doses, descriptions, and processes for preparing medicines. Drugs and preparations in the 'Pharmacopœia' are known as 'official,' and if ordered in a prescription or sold must be of Pharmacopœial strength and quality. A large number of drugs are used which are not yet official.

The student must regard the 'Pharmacopœia' at present as *the* authority for doses, characters of drugs, and their preparations. The letters B.P. affixed to the name of a drug denote that it corresponds to that described in the 'Pharmacopœia.'

Pharmaceutical Processes.

In the course of the student's practical chemistry he will have become familiar with the ordinary operations of filtration, solution, distillation, etc.; but the following processes are also used in pharmacy:

Elutriation.—This is a method of separating the heavier particles of an insoluble powder from the lighter by means of water. The powder is shaken up with water, the mixture allowed partially to subside, the supernatant liquid poured off, and the powder suspended in *this* liquid collected: it is thus a method of "water-sifting." Prepared chalk is made in this way.

Lixiviation is performed by rubbing the substance to be lixiviated with a comparatively small amount of water; in this way the most soluble portions of the substance are removed.

Maceration.—The more or less finely powdered drug is soaked in the menstruum (spirit or spirit and water, etc.) for a definite period, the mixture being frequently shaken. The insoluble portion is filtered off, washed with some of the menstruum, or pressed (expression), and the washings or pressings added to the filtrate, which is to be made up with more menstruum to a definite bulk. Many tinctures are made by this process.

Percolation, or Displacement.—This is a method whereby a powdered drug is exhausted of its soluble matter by the descent of a liquid through it. The powdered drug is packed into a cylindrical, conical, or other convenient-shaped vertical vessel. The vessel is open at both ends, and the lower end plugged with tow or covered with muslin. The menstruum is now poured on to the top of the column of powdered drug, through which it slowly

descends, dissolving in its path the soluble portions of the drug. Percolation is a rapid, convenient, and usually effective method of dissolving the soluble portion of a drug in a menstruum. The process is largely used in the manufacture of tinctures.

Pulverization.—In the manufacture of liquid preparations of drugs it is important that the drug be in a fine state of division, in order that the menstruum may thoroughly penetrate the mass. Thus the 'Pharmacopœia' directs tinctures, etc., to be made with drugs in powder, of No. 20, No. 60, and so on. These numbers refer to sieves through which the drug is to be passed, each sieve to have that number of parallel meshes in 1 inch.

Drugs are usually powdered on a large scale, and in mills, and purchased by chemists in powder.

Students should remember that most vegetable drugs have to be dried before powdering, and that the appearance of a drug (either mineral or vegetable) in powder and in crystals or natural state is often very different. Some which are highly coloured as crystals are nearly white in powder; and vegetable drugs present similar changes.

Trituration.—Applied to mixing powders in a mortar and finely powdering.

Levigation.—Applied to powdering substances as finely as possible by the aid of liquids, etc. The substance is made into a thin paste with water, oil, glycerine, lard, or other medium, and rubbed in a pestle and mortar, or with a knife upon a slab; by this means the substance can be very finely divided. It is largely used in the manufacture of ointments.

Pulverization by Intervention or Mediate Pulverization.—This consists in using some extraneous and inert substance to assist pulverization. Thus

a little alcohol assists the pulverization of camphor; and in making tinctures the drugs may often be ground to fine powder with sand.

Dialysis.—This is a method of separating substances which crystallize from those which do not crystallize—'Crystalloids' from 'Colloids.' The operation is performed by placing the solution to be dialyzed in a vessel with a parchment bottom. This vessel is floated upon the surface of water in a larger vessel. After some time the crystalloids pass through the parchment paper, and leave the colloids behind. The solution used must be an aqueous one (see *Liquor Ferri Dialysatus*).

Medicinal Preparations.

The object of these preparations is to obtain the drug, or its soluble or part of its soluble constituents in as convenient and elegant a form as possible. Since drugs vary much in character, solubility and activity, it is obvious that preparations of different drugs will require different processes for their manufacture. Particulars of these processes are to be found in the '*Pharmacopœia*.'

The quality of the preparation of a drug must necessarily vary with that of the drug itself; but there are some preparations which are known as '*Standardized*,' which contain a fixed and constant proportion of some active principle. These will be referred to under the heads of the drugs from which they are made.

Example.—*Extractum Nucis Vomicae*.

The chief preparations of the '*Pharmacopœia*' are

Aceta (Vinegars).—These are prepared by macerating the more or less finely-powdered drug in dilute acetic acid. Acetic acid is a better solvent for some drugs than water or spirit.

Example.—*Acetum Scillae*.

Aquæ (Waters).—The waters of the 'Pharmacopœia' are chiefly made by distilling an aromatic drug or an aromatic oil with water. They form useful menstrua and flavouring agents for other medicines.

The aromatic waters may be improvised by vigorously shaking half a minim of essential oil with each ounce of water required.

Example.—Aqua Menthæ Piperitæ. Aqua Camphoræ and Aqua Chloroformi are made by simple solution of the drugs in water.

Cataplasmata (Poultices).—The use of a poultice is to apply heat and moisture to the part, and the basis chosen has no medicinal action itself. Linseed-meal, however, is found to retain both heat and moisture well, and is therefore used in the B.P. for the basis of poultices. Breadcrumb is used in one case. In preparing mustard poultices, care must be taken not to mix the mustard with hot water.

Chartæ (Papers).—These are strips of paper, coated with gutta-percha or wax, impregnated with some drug, active externally. Mustard leaves are a familiar example.

Confectiones (Confections).—These are pastes made by mixing the dry powdered drug with honey, etc., or by evaporating an extract of several drugs to a paste. They always contain honey, sugar, or some sweet substance, and are eaten from a spoon, or made into small balls (boluses) and swallowed.

Decocta (Decoctions).—Decoctions are made by boiling the more or less finely-powdered drug with water for a specified time. The liquid is then strained, the insoluble part washed with water, and the washings added to the strained liquid to make a definite volume. Decoctions are simple and compound; they should be freshly made, but 'Concen-

trated Decoctions,' of which 1 part is equal to 8 parts of B.P. decoction are largely used. The dose of decoctions is large, and they serve as useful vehicles for other drugs. (Note the distinction from Infusions.)

Emplastra (Plasters).—These are external applications which are spread upon linen, calico, or other similar substance, and applied with heat to the body. The plasters of the B.P. are usually in rolls which require melting (except in the case of Cantharides plaster), and spreading with a hot iron. In ordering a plaster the physician should specify upon what substance it is to be spread.

Enemata (Enemas, Injections, Clysters).—These are liquid preparations generally having a basis of starch mucilage, and measuring 2 oz. upwards, to a pint or more. They are used by injection per rectum.

Essentiæ (Essences).—These are simple solutions of a volatile oil in rectified spirit (1 in 4). The Spiritus are similar preparations, but much weaker. Essences are useful flavouring agents, and may be used instead of aromatic waters (q. v.).

Extracta (Extracts).—These are solid substances containing all the soluble portion of the drug in a very concentrated form. They vary in consistence, from that of treacle, to a hard, brittle substance; some of them are in powder. The processes used for obtaining them are various. The following are the chief. The student must bear in mind that the object is to exhaust the drug of its soluble matter, and hence the necessity of different solvents for different drugs.

A. Green Extracts.—The juice is pressed out from the perfectly fresh plant and heated to 130° Fahr.; by this means the green colouring matter (Chlorophyll) is coagulated. This is strained off and

reserved. The strained fluid is now heated to 200° Fahr. This separates albumen (which is useless and would destroy the keeping power of the extract), the fluid is strained and the albumen rejected. The strained liquid is now evaporated at 140° to the consistence of a syrup, the green colouring matter returned, and the evaporation continued, until the extract is of the consistence of a stiff paste.

Example.—Extractum Belladonnæ.

The green colouring matter is of doubtful value as a medicine; it is simply returned to improve the appearance of the extract.

NOTE.—The evaporation of extracts is very largely performed in a vacuum. By this method they can be evaporated at much lower temperatures, and thus risk of burning or decomposition by heat avoided.

B. Fresh Extracts.—The process is the same as that for the green extracts, but in these there is no green colouring matter, so the juice is heated to 212° Fahr., the albumen filtered off, and the evaporation completed as before.

Example.—Extractum Colchici.

C. Aqueous Extracts.—In preparing these the powdered dried drug is exhausted with cold, hot, or boiling water. A solution is thus obtained of the soluble part of the drug; this is evaporated to the consistence of an extract.

Example.—Extractum Quassiæ.

D. Alcoholic Extracts.—These are made by the same series of operations as in making aqueous extracts, using spirit, or spirit and water, or proof spirit, instead of water.

Example.—Extractum Nucis Vomicae.

Some drugs contain a large amount of fat or fixed oil, which is of no value as a medicine; it is therefore removed by washing the powdered drug with

ether (which dissolves the oil), and then making an extract of the residue by the same process as that employed for the alcoholic extracts.

Example.—*Extractum Stramonii*.

E. Ethereal Extracts.—These are made in two ways:

1. By the same process as the alcoholic extracts, using ether instead of alcohol.

Example.—*Extractum Filicis Liquidum*.

2. By making an alcoholic extract of the drug, macerating this extract in ether, decanting, and evaporating.

Example.—*Extractum Mezerei Etherium*.

F. Acetic Extracts.—There is only one extract of this kind—*Extractum Colchici Aceticum*. This is made by the same process as a fresh extract, but before the juice is pressed out acetic acid is added to the crushed drug. The acetic acid renders the preparation more active (see *Colchicum*).

Extracta Liquida (Liquid Extracts).—These are made by the same process as the extracts; but instead of evaporating to a semi-solid, the evaporation is carried on to a certain point, and the product made to measure a given bulk of liquid. Spirit is always added to preserve the product. The strength of these preparations (with two exceptions) is the same; that is, one volume of the preparation equals in value one part of the drug. A fluid ounce equals a solid ounce.

Example.—*Extractum Cocæ Liquidum*.

Glycerina (Glycerines).—These are simply solutions of drugs in glycerine, or glycerine and water. They are dense and adhesive in their nature, and are therefore very useful as external applications.

Example.—*Glycerinum Acidi Tannici*.

Infusa (Infusions).—These are made by pouring boiling water over the drug or drugs, more or less

finely powdered, allowing the mixture to stand for a definite time, and straining. A better way is to suspend the drug in the water. Tea is a familiar example of an infusion. Two infusions are made with water at 120° Fahr. Infusions form useful menstrua for other drugs; the dose is usually 1 or 2 oz. (with one exception, Infusum Digitalis, 4 drams). Infusions should be freshly made, but Concentrated Infusions, of which 1 part is equal to 8 parts of B.P. infusion, are largely used. Note difference from a decoction, which is boiled.

Injectiones Hypodermicæ (Hypodermic Injections).—These are solutions of a drug for injection under the skin. Hypodermic solutions must not be acid or contain spirit. They are apt to become fungous on keeping, but may be preserved with a little Boric Acid dissolved in them; this is quite innocuous.

Lamellæ (Disks).—These are little disks made of gelatine and water, and containing a very small portion of drug in each. They are also made in sheets, divided into squares, each square representing one lamella. Lamellæ are used by oculists; one is placed in the lower eyelid, where it becomes dissolved and acts upon the eye.

Example.—Lamellæ Cocainæ.

Linimenta (Liniments, Embrocations).—These are solutions of drugs prepared by simple mixture, or by the same processes as tinctures. They contain camphor, oil, glycerine, or soap, beside the active drug, and are to be smeared, rubbed, or painted on the skin.

Examples.—Linimentum Camphoræ (oily), Linimentum Camphoræ Compositum (rubbing), Linimentum Iodi (painting).

Liquores (Liquors, Solutions).—These are solutions of drugs in water, the solutions being assisted,

if necessary, by various agents, such as acids, spirit, carbonic acid gas, etc. Solutions of vegetable substances, such as alkaloids, generally require the presence of spirit or some other preservative. The term 'Liquor' is often applied to the liquid extracts.

Lotiones (Lotions).—These are solutions or mixtures for external use, and are to be applied by washing or on lint; thus they differ from most liniments, which are to be rubbed. There are only two lotions in the 'Pharmacopœia,' but very many of the drugs in that work are ordered in lotions.

Mella (Honeys).—These are mixtures of honey with some drug. There is but one in the B.P. In this preparation advantage is taken of the sticky, non-poisonous nature of honey to form a preparation to exert local action in the mouth.

Example.—Mel Boracis.

Misturæ (Mixtures).—These are made in various ways, the object being to obtain the drug in a convenient and elegant form for internal administration. The process, therefore, alters with the nature of the drug. The following are the outlines of the chief kinds, with hints on dispensing:

Mixtures of Soluble and Miscible Drugs.—In making these the soluble salts should be dissolved with water in a mortar, or placed in the bottle (with a dry neck), water added, the salt dissolved, the other ingredients added, and the bottle filled up. The most powerful ingredients should be added last.

In making up mixtures, the dispenser should on no account mix all the active ingredients together and then add water. The bottle should be partially filled with water, most of the ingredients added, the bottle nearly filled, and the most active liquid ingredient added last. In this way decomposition

or alteration of the ingredients by their reaction upon each other is avoided.

Mixtures of Insoluble and Immiscible Drugs.—The insoluble drugs should be reduced to very fine powder, and if necessary powdered gum, tragacanth or acacia mucilage added, the mixture well triturated in a mortar, and water gradually added, with constant stirring, to the required bulk. Immiscible tinctures may be mixed with acacia or tragacanth mucilage, and water added to the required bulk. In this way substances insoluble or tinctures immiscible with water may be 'Suspended.' Such mixtures, of course, require shaking before each dose is poured out.

Emulsions.—These are mixtures of an oil, oleo-resin, or resin, with water, the mixture being effected by means of an 'Emulsifying Agent.' The oil or other substance may be placed in a mortar, powdered gum or mucilage added, the mixture well stirred, and water gradually added with constant stirring. In this way a white, milky mixture is obtained, in which the particles of oil are finely separated from each other. Emulsions may be also made by shaking the oil with water containing a little Tincture of Senega, Tincture of Quillaya Bark, and other substances. So-called emulsions are made by the aid of potash or soda, instead of mucilage; they are really soaps, and are extremely nauseous to take.

Example.—Mistura Olei Ricini.

Mucilagines (Mucilages).—These are solutions of gums in water. They are much used in making emulsions. Mucilage of Tragacanth is very convenient, as it is so rapidly made.

Oleata (Oleates).—These are semi-solid compounds of metals with oleic acid. The B.P. oleates are not pure, and are of doubtful composition. Pure

oleates can be made by precipitation. Oleates are useful external agents, being more rapidly absorbed by the skin than ordinary mixtures with lard, etc.

Example.—Oleatum Zinci.

Olea (Oils).—Solution of drugs in fixed oils. There is only one in the B.P.—Oleum Phosphoratum. Linimentum Camphoræ is a solution of camphor in oil. (For fixed and volatile oils see introduction to Part II.)

Pilulæ (Pills).—These are convenient forms of administering medicines which are insoluble, or which are intended to act slowly. The pills of the 'Pharmacopœia' are more or less soft masses or pastes. They contain drugs in powder, and extracts. The substance used to form the mass is called the 'Excipient.' One of the most useful general excipients for forming pills is the glycerine of tragacanth of the B.P. The pills of the 'Pharmacopœia' are best kept in powder, the excipient being added when the pills are required to be made. The dispenser must be careful that each pill contains the required dose of drug, otherwise he is at liberty to choose his own excipient.

Pulveres (Powders).—These are mixtures of dry insoluble substances, with sugar or other flavouring or diluting agents. They are useful methods, in some cases, of dividing a powerful substance into doses that can be conveniently weighed, as in Pulvis Elaterinæ Compositus. Powders are given dry or stirred with water.

Spiritus (Spirits).—Simple spirits are solutions of volatile oils or other substances in spirit—Spiritus Menthæ Piperitæ, Spiritus Chloroformi. Complex spirits are made by processes which often involve the decomposition of some of the alcohol, as in Spiritus Ætheris Nitrosi.

Succi.—These are the juices pressed out from perfectly fresh plants. To the freshly pressed juice is added one-third the volume of rectified spirit. This precipitates albumen, etc., which are filtered off, and also preserves the preparation.

Example.—Succus Taraxaci.

Suppositoria (Suppositories).—These are little conical masses made of oil of theobroma, glycerine, and starch, or gelatine and water, and containing some active ingredient. They melt at a low temperature, and are used by introducing one into the rectum; here they are speedily melted and absorbed by the intestine. Hollow suppositories, containing nutritives, are sometimes used.

Syrupi (Syrups).—These are solutions of sugar containing some active drug or flavouring agent. Syrups are much used for flavouring, but some of them contain powerful drugs.

Examples.—Syrupus Aurantii, Syrupus Ferri Iodidi.

Tabellæ (Tablets).—These are small round, flat lozenges containing an active ingredient, and chocolate as a basis. They are not to be sucked like lozenges, but are intended to be quickly eaten.

Example.—Tabellæ Nitro-glycerini.

Tincturæ (Tinctures).—These important preparations are alcoholic solutions of active parts of drugs. Tinctures are made by maceration, percolation, maceration and percolation (q.v.), or by simple mixture. All tinctures necessarily contain alcohol. The strength of this alcohol is regulated by the nature of the drug. Thus, resinous or oily substances require rectified spirit. Mucilaginous drugs, or drugs which contain principles soluble in water, require spirit and water or proof spirit. Tinctures may be simple or compound. The following are tinctures typical of each process:

1. *Maceration*.—Tincture of Catechu. Catechu and cinnamon bark in coarse powder are macerated with proof spirit for seven days, strained, pressed, and filtered, and proof spirit added to a definite volume (see Maceration).

2. *Percolation*.—Tinctura Zingiberis Fortior. Ginger in powder is packed in a percolator, and rectified spirit passed through until the product measures a given volume (see Percolation).

3. *Maceration and Percolation*.—Tinctura Scillæ. Bruised squill is macerated in proof spirit for forty-eight hours, the mixture transferred to a percolator, and the percolation continued with more proof spirit; the drug in the percolator is pressed, the pressings mixed with the percolate, and this made up to a definite volume with proof spirit.

4. *Simple Solution or Mixture*.—Tinctura Iodi. Iodine and iodide of potassium dissolved in rectified spirit.

Tinctura Ferri Perchloridi.—Strong solution of perchloride of iron mixed with rectified spirit and water.

Trochisci (Lozenges).—These are dried masses (round or oval), containing an active ingredient, and gum, sugar, and some flavouring agent. By means of a lozenge the medicine is brought into continuous contact with the various parts of the mouth and throat, or it may be a means of internally administering a drug.

Unguenta (Ointments).—These are semi-solid fatty substances, containing some active ingredient or ingredients, mixed with lard, wax and oil, suet, etc. Ointments are intended to exert a local action on some part of the skin, but in some cases absorption takes place and the action is general. In this way mercury is given sometimes to children. 'Inunction.' A piece of mercurial ointment being

rubbed on the skin, the mercury is absorbed. The active ingredients used in making ointment must be in the very finest possible powder, and well mixed with a little of the basis before adding the whole. The following are the chief ointment bases in the 'Pharmacopœia':

Lard, Benzoated lard. Example, Unguentum Zinci.

Hard and soft paraffin (paraffin wax and 'Vaseline'). Example, Ung. Hyd. Oxid. Rub.

Wax and oil. Example, Unguentum Cetacei.

Simple ointment. Example, Ung. Antim. Tart.

Lanoline. Adeps Lanæ Hydrosus. Example, Ung. Conii.

Vapores (Inhalations).—These are preparations made to be given in the form of vapour. The vapour arising from them is sometimes inhaled as it is; but more often the inhalation is placed in a suitable vessel with boiling water, and the steam which arises, impregnated with the medicine, inhaled.

Example.—Vapor Coninæ.

Vina (Wines).—Preparations made by macerating the drug in sherry, or by dissolving it in orange wine.

Examples.—Vinum Ferri, Vinum Ferri Citratis.

Besides the above preparations, which are official, drugs are combined to form:

Collyria (Eye Lotions).—These are weak solutions or mixtures of drugs, to be either dropped into the eye or applied with an 'eye bath.'

Gargarismata (Gargles).—These are solutions or mixtures of drugs intended to apply to the back of the throat by gargling.

Linctus (Linctus).—The term 'linctus' is applied to certain mixtures which usually contain syrup, glycerine, or honey, and are meant to be swallowed slowly in order to affect the throat.

Pessi (Pessaries).—These are large suppositories which are intended for application by the vagina.

The Weights and Measures used in Medicine:
Solids by Weight, Liquids by Measure.

There is only one legal system of weights in this country: the Avoirdupois. By this system medicines are compounded, administered, bought and sold. The 'Pharmacopœia,' however, allows the use of two weights not in the Avoirdupois system—the *dram*, 60 grains; the *scruple*, 20 grains.

Weights.

1 grain (granum)	-	-	gr.j.
1 scruple (scrupulum)	-	-	ʒj = 20 grains.
1 dram (drachma)	-	-	ʒj = 60 grains.
1 ounce (uncia—oz.)	-	-	ʒj = 437·5 grains.
1 pound (libra—lb.)	-	-	Hj = 7,000 grains.

Measures.

1 minim (minimum)	-	-	℥j.
1 dram (drachma fluida)	-	-	ʒj = 60 minims.
1 ounce (uncia fluida)	-	-	ʒj = 8 drams.
1 pint (octarius)	-	-	Oj = 20 ounces.
1 gallon (congius)	-	-	Cj = 8 pints.

Remember that a minim is not equal to a grain.

In Prescribing.

- 1 teaspoonful = 1 dram.
- 1 dessertspoonful = 2 drams.
- 1 tablespoonful = 4 drams (half an ounce).
- 2 tablespoonfuls = 1 ounce.

These measures are only approximate; and it must be borne in mind that modern spoons are considerably larger than when these relations were established.

Drops.—Guttæ (gtt.) are generally taken as minims. All medicines should be given from properly graduated glasses.

Doses.—The doses given in the text are the maximum doses of the 'Pharmacopœia.' Below these quantities the doses may be regulated according to circumstances, age, etc. To ascertain the dose for children under twelve, add twelve to the age of the child in years, and divide the age of the child by this sum. The result is the fraction of the adult dose required. Thus, let the child be eight years old: $8 + 12 = 20$, $\frac{8}{20} = \frac{2}{5}$ of the adult dose. Between twelve and twenty-one the dose will be between half the full dose and the full dose.

Consideration of the doses in special cases belongs to Therapeutics.

Methods of Administering Medicines.

Medicines may be given :

By the Mouth, in the form of mixture, pill, powder and confection.

By the Rectum or Vagina, in the form of injections (enemas), suppositories and pessaries.

By Injection under the Skin—hypodermic injection. Medicines given in this way act much more rapidly, and, as a rule, more powerfully, than when given by the mouth.

By the Skin :

1. *By Inunction.*—This method is practised sometimes on children; a small piece of mercurial ointment rubbed into certain parts of the body is absorbed, and a general effect produced. It must be remembered, however, that the usual effect of applying ointment to the skin is purely local.

2. *By Painting.*—Certain liquid preparations painted on the skin with a brush produce local or general effects.

3. *By Fumigation.*—Volatile substances (as calo-

mel) are converted into vapour and the vapour allowed to surround the part, when the pores of the skin absorb the vapour, and thus a general effect is produced.

4. *By Plasters*.—Plasters applied with heat to the skin may act mechanically or locally.

5. By the use of lotions, liniments, gargles, washes, dry powders, etc.; the effect is nearly always local.

By Inhalation.—Volatile substances, applied in the form of vapour, are drawn into the lungs, and thus a rapid general effect is produced, as in the administration of chloroform and nitrite of amyl.

Prescribing.

The subject of prescribing as regards the drugs to be used and their use belongs to Therapeutics, and students are referred to such books as Mitchell Bruce's 'Materia Medica and Therapeutics' for details on this head. A few hints from the dispenser's point of view may be useful here.

Drugs are usually ordered in contracted Latin, the names employed being, where possible, those of the 'British Pharmacopœia.' Prescribers should be very careful not to use ambiguous contractions. Thus, 'acid. hyd. dil.' may mean either prussic acid or hydrochloric acid.

Students need particularly to be cautioned against incompatibles, a full list of which is given under each drug. Some of these form often injurious compounds. The simpler a prescription is, after due regard to elegance and activity, the better.

Prescribers would save themselves much calculation if they would order one dose only on their prescriptions and state the number to be sent.

HINTS TO STUDENTS.

Students should bear in mind that the study of drugs and pharmacy is essentially practical, and that it cannot be crammed from books ; they should therefore embrace every opportunity of extending their acquaintance with drugs and dispensing, and should accustom themselves to habitually notice the smell, colour, and general appearance of the drugs and preparations they meet with. Such observations may often be taken *en passant*, without devoting special time to them.

Recognition.—The number of drugs to be recognised (93) is now so large that the student cannot expect to succeed in this branch of the subject without much practice. Each student should provide himself with small quantities of the drugs marked * in this book,* and test his ability to recognise them frequently. Special points for recognition are dealt with in the text. Those drugs which have an odour are best recognised by this character, since the mind retains the impression of an odour more easily than that of most characteristics.

Doses.—The doses in this book are the *maximum* doses allowed by the ' Pharmacopœia ; the ordinary doses are usually less. In remembering doses, students should recall the general characters and use of the drug. A knowledge of chemistry on the part of the student is presupposed.

Preparations.—Some of these, and the strengths of the most important, must necessarily be learnt off by heart ;† but the student is advised to lose no

* These may be obtained from any chemist ; but boxes containing a complete set of typical selected specimens may be had from Mr. W. M. Holmes, of Belgrave Mansions, S.W.

† In remembering the strength of tinctures, note that each half-ounce of drug to the pint of liquid is equal to 11 grains to the ounce.

opportunity of dispensing, and thus becoming practically acquainted with pharmaceutical preparations. Practice may also be obtained in the names of preparations by reading prescriptions.

Incompatibles.—The incompatibles of the inorganic drugs should cause no difficulty if the student has a fair knowledge of chemistry. He should remember that a precipitant of a salt is necessarily an incompatible. Those of the organic drugs must be learnt; it is only necessary to remember the most important.

Students are again reminded that the doses given in the text are chiefly maximum. The words 'up to' may be supplied after 'dose' in most cases. The official doses are given in the Index.

[To face p. 29.]

' PRACTICAL PHARMACY.'

ADDENDA AND ERRATA.

- Pages viii, 64, and 67, lines 11, 20, and 32, for 'iodidi' read 'iodidum.'
- „ 24, line 3, for 'legal' read 'commonly employed.'
- „ 43, „ 31, supply:—'Preparation: Trochisci Bismuthi. Bismuth lozenges. 2 grs. in each. Dose, 6.'
- „ 59, „ 21, for 'Hg₄' read 'Hg.'
- „ 63, „ 29, for 'flora,' read 'flava.'
- „ 65, „ 8, for '50' read '30 minims.'
- „ 76, „ 9 and 11, for 'acetas' read 'acet^a,¹' and for 'acetatis,' 'subacetatis.'
- „ 84, 'Trochisci Sulphuris.' Note that these are now made with precipitated, not sublimed sulphur, composition otherwise unaltered.
- „ 85, line 12, for 'sulphura' read 'sulphurata.'
- „ 88, „ 2 from bottom, for 'acid' read 'alcohol.'
- „ 89, „ 3, for 'spiriti' read 'spiritus.'
- „ 111, „ 25, for 'scillæ' read 'scilla.'
- „ 124, „ 1, for 'compositum' read 'composita.'
- „ 191. To Index add, 'Acid Benzoic.' See p. 173.
To prep. of 'acid, hydrocyanic' add 'inhalation,' p. 32.
- „ 202, add to opium preps. 'Tincture anmon.,' p. 112.
- „ 204, add to senna preps. 'Compound Liquorice Powder.' See p. 168.
- „ 205, last line, for '10' read '30 grains.'

PART I.

INORGANIC SUBSTANCES.

For convenience some of the organic acids are included in this part.

The substances marked * are those the student is expected to recognise. The numbers are for the student's convenience in using his own specimens.

Acidum Aceticum—Acetic acid, Acid of Vinegar ;
 $\text{HC}_2\text{H}_3\text{O}_2$.

Production.—Prepared from wood by destructive distillation.

Characters.—A colourless liquid, strongly acid, and with a pungent smell. It contains 33 per cent. of real acetic acid, $\text{HC}_2\text{H}_3\text{O}_2$.

There are three acetic acids in the 'British Pharmacopœia':

Acidum Aceticum (33 per cent. real acetic acid).

Acidum Aceticum Glaciale (about 99 per cent. real acid). This is a powerful caustic, and below 60° Fahr. is a colourless crystalline solid.

Acidum Aceticum Dilutum (1 part of **Acidum Aceticum** with 7 parts of distilled water: 4.27 per cent. real acetic acid). *Dose*.—1 ounce.

Vinegar, which has the same dose, contains 4.415 per cent. of real acetic acid.

Prescribing.—Acetic acid is prescribed diluted with water, both internally and externally. The

glacial acid is used as a caustic application to corns, warts, etc.

Acetic acid enters into the composition of several preparations in the 'Pharmacopœia'; in some it is used as a flavouring agent. The following owe their activity largely to its presence:

Oxymel (Honey dissolved in acetic acid and water). *Dose*.—2 drams.

Linimentum Terebinthinæ Aceticum (see Turpentine).

Acidum Boricum—Boric acid, Boracic acid; H_3BO_3 .

Production.—Boric acid occurs native in an impure state, also produced by the action of sulphuric acid on borax.

Characters.—Colourless, pearly crystalline plates, greasy to the touch. Taste slightly sour and bitter.

Soluble in Water (1 in 25), in Glycerine (1 in 5), in Rectified Spirit (1 in 16), in Boiling Water (1 in 3).

Boric acid is usually used in powder; the greasy feel is then very noticeable.

Prescribing.—Boric acid is seldom used internally; largely used in powder, solution, and ointment externally.

Dose.—30 grains.

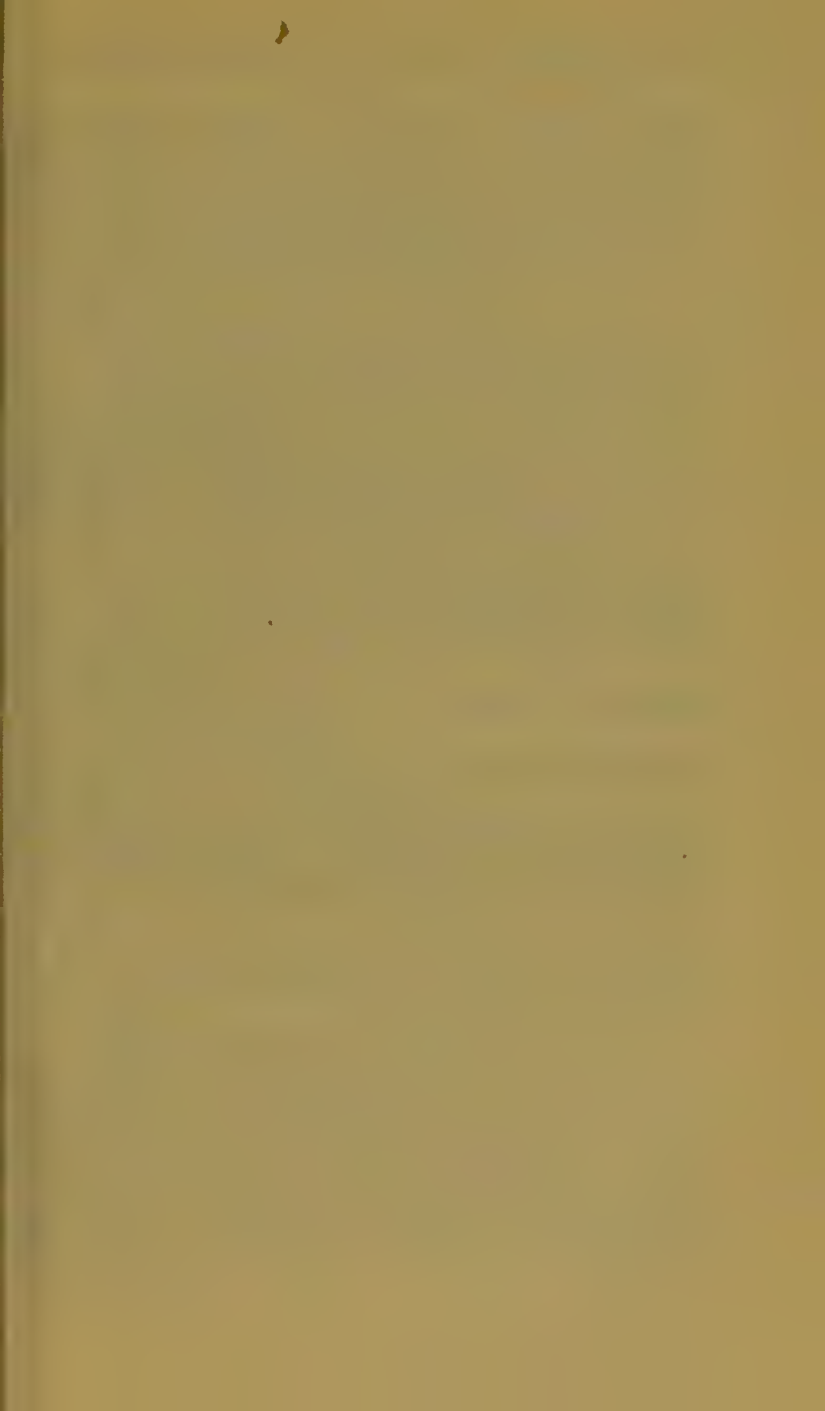
Preparation.—*Unguentum Acidi Borici* (hard and soft paraffin), 1 in 7.

Acidum Citricum—Citric acid, Acid of Lemons and Limes; $\text{H}_3\text{C}_6\text{H}_5\text{O}_7 \cdot \text{H}_2\text{O}$.

Production.—Prepared from lime or lemon juice by neutralization with chalk, and decomposing the chalk compound with sulphuric acid.

Characters.—Colourless crystals, very soluble in water (1 in $\frac{3}{4}$). Taste strongly acid.

Citric acid is generally used in powder. Care should be taken to weigh it in a dry scale-pau, as



The damp powder is very sticky. Forty grains dissolved in 1 oz. of water, with a few drops of tincture of lemon-peel, make a solution in all respects resembling lemon-juice.

Prescribing.—Citric acid is prescribed in powders, to be dissolved in water or in solution.

Dose.—30 grains.

Preparation.—*Vinum Quininae* (30 grains in 1 pint). Lemon-juice and its preparations of course contain citric acid.

Acidum Hydrochloricum — Hydrochloric acid, Muriatic acid, 'Spirits of Salts'; HCl.

Production.—By dissolving hydrochloric acid gas in water. It contains 32 per cent. of HCl.

Characters.—Nearly colourless, very strongly acid liquid, emitting white, suffocating fumes. Rarely prescribed in its undiluted state. Used internally diluted.

Incompatibles.—Nitrate of silver, Mercurous, Lead, and Antimony salts.

Preparations.—*Acidum Hydrochloricum Dilutum* (8 in 26½). *Dose.*—30 minims.

Acidum Nitro-hydrochloricum Dilutum (nitric acid 3, hydrochloric acid 4, water 25). The mixture kept for fourteen days before use). *Dose.*—20 minims.

Free hydrochloric acid also occurs in several solutions in the 'Pharmacopœia,' where it is used as a solvent.

*1. **Acidum Hydrocyanicum Dilutum**—'Prussic acid,' Hydrocyanic acid; HCN.

Production.—By dissolving HCN gas in water. The Pharmacopœial Prussic Acid contains 2 per cent. by weight of the gas. A stronger acid is sometimes used, known as 'Scheele's Prussic Acid.' This contains 4 per cent. of the gas (maximum dose 2 minims).

Characters.—A colourless liquid, having a very powerful and peculiar odour, suggestive of almonds.

Recognition.—The smell is quite peculiar, and affords the best means of recognising this very poisonous drug. It should be remembered that the vapour of prussic acid in large quantities is poisonous.

Prescribing.—Prussic acid is generally prescribed in a mixture or by inhalation. It is customary to label mixtures containing it, 'Shake the bottle.' Prussic acid is also prescribed, diluted with water, for a lotion. Bottles containing prussic acid should be closely corked, and not opened more than is necessary.

Dose.—2 to 8 minims.

Incompatibles.—Silver, Copper, and Iron salts, Oxide and Sulphide of Mercury.

Preparations.—*Vapor Acid. Hydrocyanici* (Dilute Prussic acid 10 to 15 minims, water to 1 dram = 1 inhalation.)

Prussic acid enters into the composition of the *Tinctura Chloroformi et Morphinæ*—'Chlorodyne' (1 in 16). (See Chloroform.)

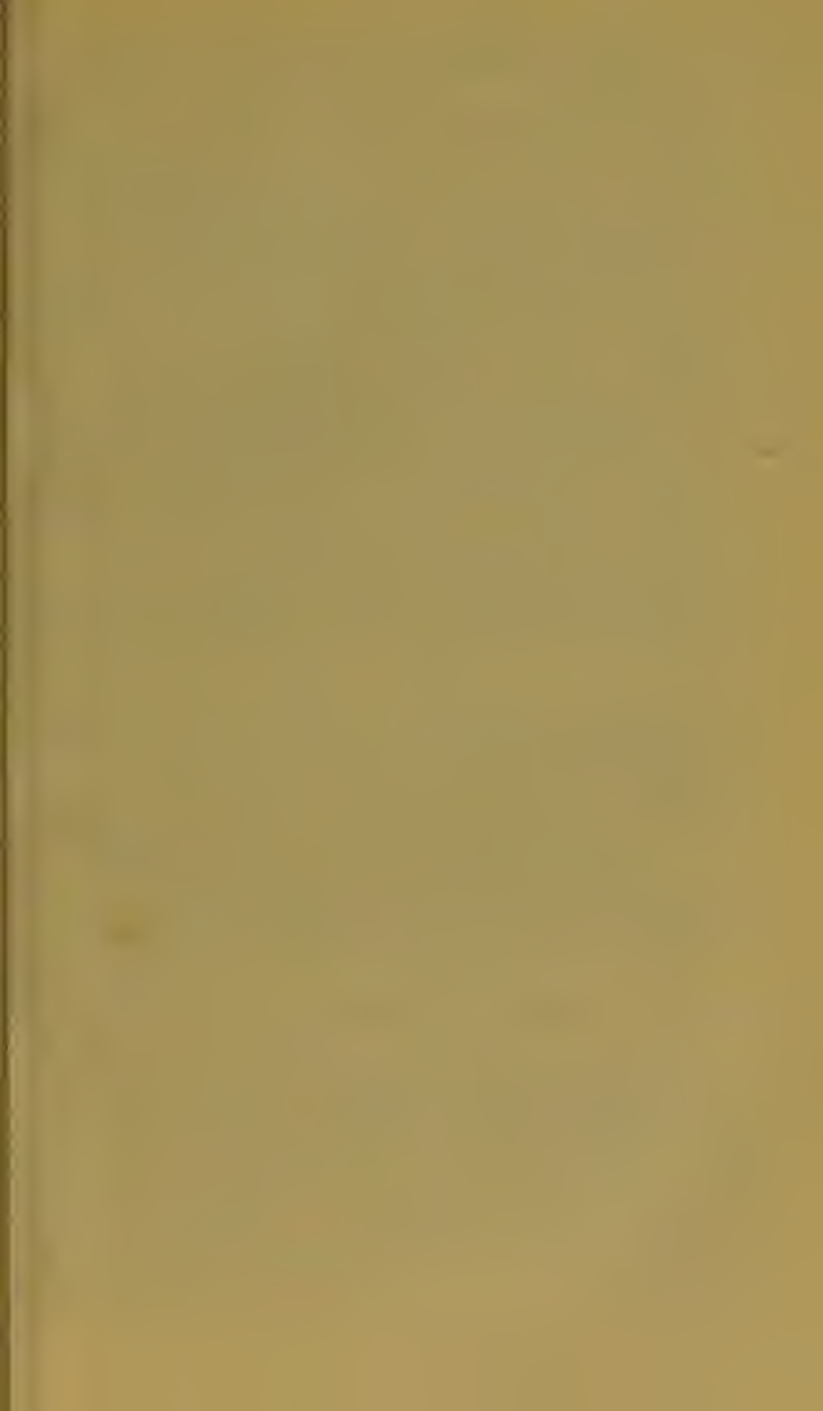
Prussic acid is produced in large quantities in distilling bitter almonds. Cherry laurel leaves distilled with water yield prussic acid. The *Aqua Laurocerasi* of the 'Pharmacopœia' contains $\frac{1}{10}$ per cent. of real acid. *Dose.*—2 drams.

Acidum Nitricum—Nitric acid; HNO_3 .

Production.—By dissolving nitric acid gas in water; it contains 70 per cent. of real nitric acid.

Characters.—Colourless, intensely acid and corrosive liquid, emitting white, irritating fumes. Strong nitric acid is frequently slightly yellow in colour. The acid destroys the skin, and stains it deep yellow.

Prescribing.—Rarely prescribed internally un-



diluted. Largely used as a caustic, and given diluted internally.

Preparations.—*Acidum Nitricum Dilutum* (6 in 31). *Dose.*—30 minims.

Acid. Nitro-hydrochloricum (see Hydrochloric Acid).

Free nitric acid occurs in Acid Solution and Ointment of Nitrate of Mercury.

Acidum Sulphuricum—Sulphuric acid, 'Oil of Vitriol,' 'Vitriol'; H_2SO_4 .

Production.—By the combustion of sulphur, and oxidation and hydration of the resulting sulphurous acid.

Characters.—Colourless oily liquid, intensely acid and corrosive. Gives off much heat when mixed with water. Sulphuric acid is frequently slightly coloured from the presence of organic matter.

Prescribing.—Rarely prescribed undiluted. Sometimes used as a caustic. In preparing the dilute acid care should be taken to add the acid to the water, not *vice-versâ*. The dilute acid is largely used internally.

Incompatibles.—Lead salts, Calcium salts.

Preparations.—*Acidum Sulphuricum Aromaticum* (strong tincture of ginger 2; spirit of cinnamon 2; rectified spirit 36; sulphuric acid 3; mix). *Dose.*—30 minims.

Acid. Sulphuricum Dilutum (7 in 83½). *Dose.*—30 minims.

Of these two preparations the aromatic sulphuric acid is slightly the weaker. Largely diluted with water, it is sometimes used as an acid drink, also used in the preparation of *Infusum Cinchonæ Acidum* (1 in 81).

Dilute sulphuric acid is used in making *Infusum Rosæ Acidum*.

Acid. Sulphurosum—Sulphurous acid ; H_2SO_3 .

Production.—By dissolving sulphurous acid gas in water. Sulphurous acid should contain 6·4 per cent. of H_2SO_3 .

Characters.—A colourless liquid, with an extremely penetrating sulphurous odour. Sulphurous acid is a powerful bleaching and disinfecting agent.

Prescribing.—In mixture diluted, generally in association with syrup.

Dose.—1 dram.

Incompatibles.—Permanganate of potash, and all substances which easily yield oxygen.

Sodium Sulphite, *Dose* 20 grains ; and

Sodium Hyposulphite, *Dose* 60 grains, probably owe their activity to their acidulous radicle.

Acidum Tartaricum—Tartaric acid ; $\text{H}_2\text{C}_4\text{H}_4\text{O}_6$.

Production.—From Acid Tartrate of Potassium, by treatment with chalk and sulphuric acid.

Characters.—Colourless crystals, usually somewhat smaller than citric acid. Soluble freely in water and in rectified spirit. Tartaric acid strongly resembles citric acid in its properties, and, being cheaper, is frequently used to replace it. Tartaric acid is generally prescribed in powders to be taken in water, or in solution.

Dose.—30 grains.

Preparation.—*Pulvis Sodæ Tartarataë Effervescentis*—'Seidlitz Powders' (38 grains in each).

*2. **Alumen**—Alum ;

$\text{Al}_2(\text{SO}_4)_3 \cdot \text{K}_2\text{SO}_4 \cdot 24\text{H}_2\text{O}$, $\text{Al}_2(\text{SO}_4)_3 \cdot (\text{NH}_4)_2\text{SO}_4 \cdot 24\text{H}_2\text{O}$.

The term Alum is applied to a large class of salts having the constitution of a double sulphate with 24 molecules of water. The two alums of the 'Pharmacopœia' are known as Potash Alum and Ammonia Alum ; the former is by far the most common.

Characters.—In large transparent crystals, ex-

hibiting parts of the regular octahedron. Taste nauseously astringent and acid. Soluble in water (1 in 10); like all sulphates of inorganic radicles, it is insoluble in spirit.

Recognition.—Alum in the crystalline state may be recognised by its characteristic shape. In powder, in which form it is generally used in medicine, the peculiar taste will identify it.

Prescribing.—Alum is usually prescribed in solution.

Dose.—20 grains.

Incompatibles.—Mercury, Iron, Lime, and Lead salts; Alkalies, Tartrates, and Tannic acid; Antipyrin.

Preparation.—*Glycerinum Aluminis* (1 in 6), Alum dissolved by heat in glycerine.

*3. **Alumen Exsiccatum**—Alumen Ustum, Dried Alum, 'Burnt Alum.'—This is potash alum, from which the water has been driven by heat; 45 per cent. of water is driven off. Roughly speaking, 1 part of dried alum is equal to 2 parts of ordinary alum.

Characters and Recognition.—Alumen Exsiccatum is in very light, porous, white masses, which have a granular and cracked appearance. The appearance and taste distinguish it. It dissolves slowly in water.

Prescribing.—Dried alum is used externally, in the form of fine powder.

*4. **Ammonii Carbonas**—Carbonate of ammonia, Sesquicarbonate of Ammonia; $N_3H_{11}C_2O_5$.

Production.—By subliming a mixture of chloride of ammonium and carbonate of calcium. It is a mixture of Acid Carbonate and Carbamate of Ammonia.

Characters.—Translucent crystalline masses, smelling strongly of ammonia. Soluble in water (1 in 4); soluble in spirit.

Recognition.—The smell and the translucent appearance of the salt, especially when freshly broken, afford the best means of recognition. Samples which have been much exposed to the air are powdery on the outside.

Prescribing.—Carbonate of ammonia is usually prescribed in solution.

Dose.—10 grains as a stimulant and expectorant; 30 grains as an emetic.

Incompatibles.—Sulphate of Magnesia, Calcium salts, Acids, and Acid Infusions.

Preparation.—*Spiritus Ammoniae Aromaticus* ($\frac{1}{2}$ oz. in 1 pint). (See Ammonia.)

*5. **Ammonii Chloridum**—Chloride of Ammonium, Sal Ammoniac; NH_4Cl .

Production.—By neutralizing Ammonia with Hydrochloric Acid and evaporating to dryness.

Characters.—Translucent fibrous masses, without smell. Tough and difficult to powder. Freely soluble in water (1 in 4) and rectified spirit.

Recognition.—The peculiar fibrous appearance of sal ammoniac affords the best means of recognising it.

Sal Ammoniac is almost always used in powder in medicine. The best way to powder it is to dissolve the salt in hot water, and evaporate the solution to dryness, constantly stirring. The powder is granular.

Prescribing.—Chloride of Ammonium may be prescribed in powders, to be dissolved in water or in solution. It may also be mixed with common salt and eaten at table.

Dose.—20 grains.

Incompatibles.—Alkalies and Alkaline Carbonates.

Liquor Ammoniae Fortior—Strong solution of Ammonia, 'Hartshorn,' Liquor Vol. C.C.; NH_4HO .

Production.—By dissolving Ammonia gas, NH_3 ,

in water. Strong solution of Ammonia contains 32·5 per cent. of the gas.

Characters.—A colourless liquid with a very pungent smell; powerfully alkaline. Strong solution of Ammonia is powerfully caustic, and is largely used as an application to stings, etc. Its vapour is inhaled in small quantities as a stimulant. Never prescribed internally undiluted.

Preparations.—*Liquor Ammonia* (strong solution of Ammonia 1, water 2). *Dose.*—20 minims, largely diluted.

Spiritus Ammonia Aromaticus—'Sal Volatile' (Carbonate of Ammonia 4 oz., Strong solution of Ammonia 8 oz., oils of Nutmeg and Lemon, Rectified spirit and water distil. 1 gal.). *Dose.*—1 dram.

Spiritus Ammonia Fætidus (Asafœtida, strong Ammonia, Rectified Spirit). *Dose.*—1 dram.

Linimentum Camphoræ Compositum (1 in 4½). (See Camphor.)

Linimentum Ammonia (Solution of Ammonia Olive oil 3)—'Hartshorn and Oil.'

Tinctura Opii Ammoniata (strong solution of Ammonia—1 in 5). (See Opium.)

Liquor Ammonii Acetatis—Solution of Acetate of Ammonia, 'Mindererus' Spirit'; $\text{NH}_4\text{C}_2\text{H}_3\text{O}_2$.

Production.—By neutralizing Carbonate of Ammonia with Acetic Acid. It should be noticed that there are two strengths of this solution in the 'Pharmacopœia.'

Liquor Ammonii Acetatis Fortior.

Dose.—75 minims.

Liquor Ammonii Acetatis.

Dose.—6 drams (1 part strong solution to 5 of water).

Characters.—Colourless liquids; taste vapid and nauseous. Solutions of Acetate of Ammonium dissolve insoluble lead salts and Salicylic Acid.

Prescribed in mixtures.

Incompatibles.—Iron salts, Alkalies, and Alkaline Carbonates.

Antimonium Tartaratum—Tartarated Antimony, 'Tartar Emetic,' Potassio-tartrate of Antimony; $(\text{KSbOC}_4\text{H}_4\text{O}_6)_2\text{H}_2\text{O}$.

Production.—By mixing oxide of antimony and bitartrate of potash into a paste with water, allowing to stand, and boiling the paste in water. It is an oxytartrate of antimony and potassium, and must be carefully distinguished from Potassium Bitartrate.

Characters.—Colourless transparent crystals with triangular facets. Soluble in water (1 in 20); slightly in proof spirit. The solution is faintly acid.

Tartar Emetic may be prescribed in powder, in pill, or in solution. Small doses are best given in solution.

Doses.— $\frac{1}{6}$ grain as a diaphoretic; 1 grain as a depressant; 2 grains as an emetic.

The student should carefully note these three doses, and remember that substances with emetic properties have nearly always two ranges of doses.

Incompatibles.—Vegetable Astringent Substances, Lead salts, Alkalies, and Tannic and Gallic Acids (the latter acting as antidotes in poisoning by Tartar Emetic).

Preparations.—*Unguentum Antimonii Tartarati* (simple ointment—1 in 5).

Vinum Antimoniale (2 grains in 1 oz. sherry).

Dose.—5 minims to 1 dram.

Argenti Nitras—Nitrate of Silver, Caustic, 'Lunar Caustic'; AgNO_3 .

Production.—By dissolving silver in dilute nitric acid, and crystallizing.

Characters.—Nitrate of silver is used in two

forms: colourless crystals and sticks. The sticks are made by melting the crystals, and cooling the fluid in moulds. The substances are, of course, identical in other respects. Nitrate of silver is very soluble in water (2 in 1); in spirit, 1 in 15. It is very easily decomposed by contact with organic matter, and must not be kept in corked bottles, or the solution filtered through paper. It is a powerful caustic, turning the skin black. Nitrate of silver may be prescribed in pill (avoiding the use of glycerine or organic recipient), or in solution. Lotions should be applied with a glass rod or brush.

Dose.— $\frac{1}{3}$ grain.

Incompatibles.—Organic matter, Astringent Infusions, etc., Alkalies and their Carbonates, Chlorides, Acids (except Nitric and Acetic), Solution of Arsenic, Iodide of Potassium.

Preparations.—*Argenti et Potassii Nitras* — 'Mitigated Caustic' (1, Nitrate of Silver; 2, Nitrate of Potassium).—Cast into sticks for convenience in rubbing on the skin. '*Toughened Caustic*' is Nitrate of Silver with 5 per cent. of Nitrate of Potassium. It is cast in small points for fitting into cases. It does not break so easily as ordinary Caustic.

*30. *Acidum Arseniosum.*—Arsenious Acid, Arsenious Anhydride, 'White Arsenic,' Arsenic, Arsenicum Album; As_2O_3 .

Production.—By roasting Arsenical ores, and purifying by sublimation.

Characters.—In large porcelain-like masses, with a stratified, vitreous appearance when broken, or in small dirty-white, heavy crystals, or in a heavy white powder; sublimes by heat, forming brilliant and transparent octahedra. Soluble in water (1 in 100), in boiling water (1 in 20).

Recognition.—If Arsenious Anhydride be in masses, its weight, white, porcelain-like appearance, and glassy fracture, enable us to identify it. In crystals it requires much practice to recognise it, and in powder this cannot be done with certainty without chemical tests. Even in powder, however, the student should be able to refer it to one of two or three substances of the same appearance.

Prescribing.—Arsenious Acid may be prescribed in pills; for which purpose not less than 1 grain should be weighed and divided, as directed under Mercuric Chloride. Arsenious Acid is, however, best given in solution by means of the official liquors. It should not be given on an empty stomach. Arsenious Acid is used externally in the form of paste as a caustic, and for destroying the nerves in teeth.

Dose.— $\frac{1}{12}$ grain.

Incompatibles.—Nitrate of Silver.

Preparations.—*Liquor Arsenicalis*—'Fowler's Solution,' *Liquor Fowleri* (1 Arsenious Acid in 100 of water, with Carbonate of Potassium and Tincture of Lavender).

This is simply an alkaline solution of Arsenious Acid coloured with Tincture of Lavender. *Dose.*—8 minims.

Liquor Arsenici Hydrochloricus (1 arsenic in 100 water, with hydrochloric acid). *Dose.*—8 minims.

Note that these two solutions contain free arsenious acid, and are of the same strength and dose.

Arsenii Iodidum.—Iodide of Arsenic, Arsenious iodide; AsI_3 .

Production.—By the direct combination of Iodine and Metallic Arsenic.

Characters.—Small orange-coloured crystals, soluble in water and in rectified spirit.

Prescribing.—Iodide of Arsenic may be given in pill in the same way as Arsenious Acid. It is, however, always used in solution, and generally as Liquor Donovan (see below).

Dose.— $\frac{1}{30}$ grain.

Incompatibles.—See below.

Preparations.—*Liquor Arsenii et Hydrargyri Iodidi*—Solution of Iodides of Arsenic and Mercury, ' Donovan's Solution,' Liquor Donovan.

Production.—By dissolving 45 grains each of Iodide of Mercury and Iodide of Arsenic in 10 oz. of distilled water. It contains 1 per cent. of each salt.

Characters.—A clear yellow liquid, inodorous, or with slight smell of iodine, and a metallic taste.

Dose.—30 minims.

Incompatibles.—Mercuric chloride, Substances containing Free Chlorine, Liquor Bismuthi, Caustic Potash, Spirit of Nitrous Ether (unless quite neutral), Antipyrin.

*31. **Ferri Arsenias**—Arseniate of Iron.—A mixture of arseniates of iron with oxide.

Production.—By mixing solutions of Arseniate of Sodium, Bicarbonate of Sodium, and Sulphate of Iron, and collecting the precipitate.

Characters.—A tasteless, odourless, amorphous powder, of a greenish colour, insoluble in water.

Recognition.—The amorphous nature and peculiar green tint of the salt at once distinguish it. The student must carefully distinguish it from Phosphate of Iron, which is blue.

Prescribing.—Ferri Arsenias may be ordered in pill, in the same way as Arsenious Acid (q.v.).

Dose.— $\frac{1}{2}$ grain.

Sodii Arsenias—Arseniate of Sodium;

$\text{Na}_2\text{HAsO}_4 \cdot 12\text{H}_2\text{O}$ and $\text{Na}_2\text{HAsO}_4 \cdot 7\text{H}_2\text{O}$.

Production.—By fusing a mixture of Arsenious

Characters.—A white powder, insoluble in water, soluble in solution of Ammonia.

Prescribing.—Citrate of Bismuth may be prescribed in pill or powders, but is best given in its solution in Ammonia.

Dose.—5 grains.

Liquor Bismuthi et Ammonii Citratis—Liquor Bismuthi.—The only liquid preparation containing Bismuth (800 grains dissolved in Liquor Ammoniaæ q.s. to dissolve and water to 1 pint). A colourless liquid with a slight ammoniacal smell.

Dose.—1 dram.

Incompatibles.—Alkalies, Alkaline Carbonates.

Bismuthi Subnitratis — Oxynitrate of Bismuth, 'Bismuthum Album,' Subnitrate of Bismuth; $\text{BiONO}_3, \text{H}_2\text{O}$.

Production.—By dissolving Bismuth in Nitric Acid and pouring the solution into water. It is an oxynitrate.

Characters.—Very heavy white crystalline powder, with an acid reaction. Insoluble in water.

Prescribing.—Subnitrate of Bismuth may be prescribed in pill, powders, or in mixture suspended with acacia gum. The use of tragacanth is to be avoided. Bismuth Subnitrate, owing to its acid reaction, should not be prescribed with the alkaline carbonates. The Carbonate of Bismuth is a more useful salt.

Dose.—20 grains.

Incompatibles.—The Alkaline Carbonates and Bicarbonates.

Borax (see Sodium Salts).

Bromum—Bromine; Br_2 .

Production.—An elementary substance obtained from sea-water and certain saline springs.

Characters.—A dark, reddish-brown liquor, very volatile and giving off ruddy fumes. Odour strong

and suffocating. Soluble in water (1 in 30) and rectified spirit.

Prescribing.—Bromine is very rarely given internally in its free state; it is sometimes used externally as a caustic, diluted with rectified spirit (1 in 5), and the mixture applied with a glass rod.

Preparation.—*Acidum Hydrobromicum Dilutum.* Colourless, inodorous, acid liquid.

Dose.—50 minims.

Ammonii Bromidum—Bromide of Ammonium; NH_4Br .

Production.—By neutralizing Hydrobromic Acid with Ammonia, evaporating and crystallizing.

Characters.—In granular crystalline powder, white or slightly yellow from exposure to air. Soluble in water (1 in $1\frac{1}{2}$) and in rectified spirit.

Prescribing.—Bromide of Ammonium may be prescribed in powders, to be dissolved in water, or in solution.

Dose.—20 grains.

Incompatibles.—Alkalies.

***6. Potassii Bromidum**—Bromide of Potash; KBr .

Production.—By the action of Bromine upon solution of Potash, evaporation, fusion of the residue with charcoal, and crystallization.

Characters.—Colourless cubical crystals, inodorous; taste saline and pungent. Soluble in water and in rectified spirit.

Recognition.—With some practice, potassium bromide may be recognised by the general appearance of its crystals. No substance (except Potassium Iodide) that has to be recognised by the student at all resembles it. The crystals of Potassium Iodide are generally larger, and more distinctly cubical, than those of Potassium Bromide; the two salts can, of course, be at once distin-

guished by chemical tests. Mercuric Chloride, for example, gives a scarlet colour with solutions of the Iodide, not with the Bromide.

Prescribing.—Potassium Bromide is usually prescribed in solution.

Dose.—30 grains.

Incompatibles.—Solutions containing free Chlorine or much free acid.

Sodii Bromidum—Bromide of Soda ; NaBr.

Production.—By the same process as the Potassium salt, using solution of Soda instead of Potash.

Characters.—Granular, crystalline, white powder, deliquescent, inodorous, soluble in water (1 in 2) and in spirit.

Prescribed in solution.

Dose.—30 grains.

Incompatibles.—As the Potassium salt.

Calx—Lime, Oxide of Calcium, ' Quicklime ; ' CaO.

Production.—By calcining chalk or limestone.

Characters.—Compact white or slightly yellow masses, which, on contact with water, swell with development of heat and fall into powder. This powder is ' Slaked Lime.' The purest lime is that made from marble, and this should alone be used for medicinal purposes. Lime is powerfully caustic, and should be cautiously handled. It is sometimes used alone or mixed with Potash, as a caustic—' Vienna Paste.' Lime is not used internally.

Calcii Hydras—Hydrate of Calcium, ' Slaked Lime ; ' $\text{Ca}(\text{OH})_2$.

Production.—By combining Lime with water (slaking).

Characters.—White or slightly yellowish powder, strongly alkaline, soluble in cold water (1 in 900), less soluble in hot water. In water, with sugar (1 in 60), slaked lime should be kept in bottles, carefully

closed from the air, as it rapidly absorbs CO_2 , and forms insoluble chalk.

Prescribing.—Calcium Hydrate is very largely prescribed in solution—'Lime-water.' Calcium Hydrate is also applied as a paste with water to the skin, and in solution as lotions and injections.

Incompatibles.—Vegetable and Mineral Acids, Metallic and Alkaline Salts, Tartar Emetic. Some Colouring Matters are precipitated or altered by Lime-water.

Preparations. — *Liquor Calcis* — Aqua Calcis, 'Lime-water' (saturated solution of washed lime in distilled water— $\frac{1}{2}$ grain lime in 1 oz.). *Dose.*—4 oz.

Lime-water is used in making *Linimentum Calcis* (equal parts of Lime-water and Olive oil), 'Carron Oil,' and *Lotiones Hydrargyri Flava et Hydrargyri Nigra*.

Liquor Calcis Saccharatus (a solution of slaked lime and sugar in distilled water—7·11 grains of lime in 1 oz.). *Dose.*—60 minims.

Calcii Carbonas Præcipitata—Precipitated Carbonate of Lime, Precipitated Chalk; CaCO_3 .

Production.—By precipitating a boiling solution of Chloride of Calcium, by a boiling solution of Carbonate of Sodium.

Characters. — A white crystalline powder, insoluble in water.

Prescribing.—Precipitated chalk is seldom prescribed internally, as, on account of its crystalline nature, it is irritating to the coats of the canal. It is largely used as a basis for tooth-powders, etc.

Dose.—60 grains.

Preparation.—*Trochisci Bismuthi* (4 grains in each).

Creta Præparata—'Prepared Chalk,' Carbonate of Calcium; CaCO_3 .

Production.—Native chalk purified by elutriation.

Characters.—In white conical masses; *amorphous*; insoluble in water. The conical shape of the pieces of chalk is due to the method of purification; while the chalk is in a pasty state it is forced through metal tubes.

Prescribing.—Chalk is largely prescribed internally in mixtures and powders. A little acacia mucilage is usually employed to suspend the chalk. Chalk is also used externally in the form of powder dusted on the skin.

Dose.—60 grains.

Incompatibles.—Acids and Sulphates.

Preparations.—*Mistura Cretæ*—'Chalk Mixture' (Chalk 1, Gum Acacia 1, Syrup 2, Cinnamon Water 30—1 in 32). *Dose.*—2 oz.

Pulvis Cretæ Aromaticus—'Aromatic Confection' (Chalk, Cinnamon, Nutmeg, Saffron, Cloves, Cardamoms, and sugar in powder mixed—1 in 4). *Dose.*—60 grains.

Pulvis Cretæ Aromaticus cum Opio (1 in 40 of Opium). *Dose.*—40 grains.

Prepared chalk is employed in making 'Grey Powder.'

Hydrargyrum cum Creta (2 in 3). (See Mercury.)

Liquor Chlorig—Solution of Chlorine, 'Chlorine Water'; Cl_2 .

Production.—By dissolving chlorine gas in water.

Characters.—A yellowish-green liquid, smelling strongly of chlorine. Chlorine water is a powerful bleaching and disinfecting agent, acting by causing oxidation. It should be freshly made.

Prescribing.—Chlorine water may be prescribed in mixture, diluted with water. A mixture containing Chlorine and 'Euchlorine' may be made by pouring a little strong Hydrochloric Acid on Potassium Chlorate in a bottle, and diluting with water. This mixture is largely used. Chlorine water is

also used in lotions and gargles, and as a disinfectant.

Dose.—20 minims.

Incompatibles.—Silver and Lead salts, Bromide and Iodide of Potassium.

Acid Nitro-hydrochloric contains free chlorine.

*7. **Calx Chlorinata**—Chlorinated Lime, Bleaching Powder, 'Chloride of Lime'; CaCl_2O_2 , CaCl_2 , or CaOCl_2 .

Production.—By passing Chlorine over slaked lime.

Characters. — A white dry powder, smelling strongly of chlorine. Partially soluble in water. Disinfecting and bleaching. Contains 33 per cent. available Chlorine.

Recognition.—Calx Chlorinata is at once recognised by its odour of Chlorine and general appearance. Not given internally; used chiefly as a disinfectant.

Preparations.—*Liquor Calcis Chlorinatæ* (a solution in water, 1 in 10); yields 3 per cent. available Chlorine.

Vapor Chlorig (chlorinated lime 2 oz., water to moisten = 1 inhalation).

Liq. Sodæ Chlorinatæ—Solution of Chlorinated Soda; NaCl.NaClO .

Production.—By mixing solutions of Carbonate of Sodium and Chlorinated Lime, and filtering.

Characters.—A colourless liquid, smelling of Chlorine. Alkaline. Taste astringent. Bleaches. Yields $2\frac{1}{2}$ per cent. of available Chlorine.

Prescribing.—Solution of Chlorinated Soda may be used in the same way as solution of Chlorine. It is pleasanter to take. The dose of both preparations is the same, and their action similar. The Soda solution is the more stable preparation.

Dose.—20 minims.

Incompatibles.—As those of Chlorine Water, and with acids.

Preparation. — *Cataplasma Sodæ Chlorinatæ*—Chlorine Poultice (Solution of Chlorinated Soda, 2 oz. ; Linseed Meal, 4 ; water, 8).

*8. **Cupri Sulphas**—Sulphate of Copper, 'Blue Vitriol,' Blue Stone ; $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$.

Production.—By dissolving Cupric Oxide in hot dilute Sulphuric Acid and crystallizing.

Characters. — In large blue crystals. Taste astringent and metallic. Soluble in water (1 in 3). Solution acid and caustic. Insoluble in spirit.

Recognition.—Sulphate of Copper may be recognised by its blue colour and the size and shape of its crystals.

Prescribing.—Sulphate of Copper may be prescribed in pill, solution, and mixture. The pill is the most suitable form for internal use. Sulphate of Copper is largely used in dilute solution as a caustic lotion or injection. 'Lapis Divinus' in small blue rods, contains Alum, Sulphate of Copper, and Nitre, fused together. It is largely used.

Dose.—2 grains as astringent or tonic ; 10 grains as emetic.

Incompatibles.—Vegetable astringents, Alkalies, especially Ammonia, Lime-water, Mineral salts, Iodides, Antipyrin. Sulphates may usually be prescribed safely with Sulphate of Copper.

Ferrum—Iron ; Fe_2 .

For making medicinal preparations of Iron, iron wire (No. 35), clean iron filings, or wrought-iron nails, may be used. These should be free from rust.

Preparations.—Preparations made direct from metallic iron are as follows (for further particulars see under their respective heads) :

Ferri Sulphas.

Ferri Sulphas Granulata.

Liquor Ferri Perchloridi Fortior.

Liq. Ferri Pernitratis.

Mist. Ferri Aromatica—Iron wire, Cinchona Bark, Calumba, Cloves, Tinctures of Cardamoms and Orange-peel, Peppermint Water. Digested. Dose. —2 oz.

Pilula Ferri Iodidi.

Syrupus Ferri Iodidi.

Syrupus Ferri Subchloridi.

Vinum Ferri—Iron wire digested in sherry (1 in 20). Dose.—4 drams.

*9. **Ferrum Redactum**—Reduced Iron, 'Powdered Iron'; Fe_2 .

Production.—By passing Hydrogen over heated Ferric Oxyhydrate.

Characters.—Grayish-black metallic powder. Insoluble in water. Should not give off H_2S when treated with Hydrochloric Acid. It consists of Metallic Iron with a little Oxide.

Recognition.—Note that the powder is grayish-black, has no taste or smell, is heavy, and when rubbed with a hard body exhibits metallic streaks. It is also strongly attracted by a magnet.

Prescribing.—Reduced Iron may be prescribed in powders or in pills; the former is a usual form, the substance having very little taste.

Dose.—5 grains.

Preparation.—*Trochisci Ferri Redacti* (each lozenge contains 1 grain). Dose.—6.

*10. **Ferri Sulphas**—Sulphate of Iron, Ferrous Sulphate, 'Green Vitriol,' 'Green Copperas'; $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$.

Production.—By the action of dilute Sulphuric Acid on Metallic Iron, filtering and crystallizing.

Characters.—In small green crystals. Taste

styptic and metallic. Soluble in water (1 in $1\frac{1}{2}$), insoluble in spirit.

Recognition.—Sulphate of Iron may be recognised by the colour and shape of its crystals. No other salt to be recognised resembles it. Crystals which have been much exposed, especially if the air be damp, are often reddish-brown on the outside.

Prescribing.—Sulphate of Iron may be prescribed in pills (but the dried Sulphate is preferable for this form) or in solution. Solutions keep better if rendered acid with dilute Sulphuric Acid.

Dose.—5 grains.

Incompatibles.—(Note : the incompatibles of most Iron Salts are very similar, and the following list applies generally to Ferruginous preparations.) All Astringent Substances ; Vegetable Infusions, Decoctions and Tinctures, except those of Quassia and Calumba ; Mucilages ; Tannic and Gallic Acids, Salicylic Acid and Salicylates, Benzoic Acid and Benzoates, Carbolic Acid, Sulpho - Carbolates ; Acetates ; Alkalies and their Carbonates, Lime-water, Carbonates of Lime and Magnesia, Morphine ; Antipyrin, Sal Volatile.

Preparations.—*Mistura Ferri Composita*—' Griffith's Mixture ' (Sulphate of Iron, Carbonate of Potassium, Myrrh, Sugar, Spirit of Nutmeg, Rose-water— $2\frac{1}{2}$ grains in 1 oz.). *Dose.*—2 oz.

Pilula Aloes et Ferri (1 in 7 ; see Aloes, Part II.).

Pilula Ferri—' Blaud's Pills ' (Sulphate of Iron, Carbonate of Potassium, Sugar, Tragacanth, Glycerine and Water). One pill contains 1 grain Carbonate of Iron. *Dose.*—4.

Ferri Sulphas Exsiccata—Dried Sulphate of Iron ; $\text{FeSO}_4\text{H}_2\text{O}$.

Production.—By heating Sulphate of Iron at 212° until 6 molecules of water of crystallization

are driven off. The remaining molecule cannot be got rid of without decomposition.

Characters.—A dirty-white powder. Soluble in water; insoluble in spirit.

Prescribing.—Dried Sulphate of Iron is prescribed in the form of pills. It should be remembered that $2\frac{1}{2}$ grains are equal to 4 grains of undried Sulphate.

Dose.—3 grains.

Incompatibles.—As Sulphate.

*10a. **Ferri Sulphas Granulata**—Granulated Sulphate of Iron; $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$.

Production.—By pouring solution of Sulphate of Iron (freshly made from iron and acid) into Rectified Spirit.

Characters.—In small granular, green crystals. Other characters as those of Ferri Sulphas.

Prescribing.—Ferri Sulph. Granulata is prescribed in solution. It is a very pure form of Ferri Sulphas, and, owing to its finely divided state, very useful for dispensing; it may replace Ferri Sulphas on all occasions.

Dose.—5 grains.

Incompatibles.—As Sulphate.

*11. **Ferri Carbonas Saccharata**—Saccharated Carbonate of Iron, Ferrous Carbonate with Sugar; $\text{FeCO}_3 \cdot x\text{H}_2\text{O}$.

Production.—By precipitating solution of Ferrous Sulphate with Carbonate of Ammonium, and mixing the moist precipitate with sugar. It contains about $\frac{1}{3}$ anhydrous carbonate of iron.

The sugar is used to coat the particles of Ferrous Carbonate and prevent oxidation; but the salt always contains some oxide.

Characters.—Grayish-brown powder or coherent lumps, with a sweet, ferruginous taste. Insoluble in water.

Recognition.—Note the grayish-brown colour and coherent nature of the salt. The appearance and sweet, ferruginous taste are sufficient guides to recognition.

Prescribing.—Saccharated Carbonate of Iron is usually prescribed in powders; the taste is not disagreeable, and not at all astringent. In pills the salt should be prescribed in the form of *Pilula Ferri*—'Blaud's Pills.'

Dose.—30 grains.

Preparation.—*Pilula Ferri Carbonatis* (Saccharated Carbonate of Iron, Confection of Roses—4 in 5). *Dose.*—20 grains.

Liquor Ferri Acetatis Fortior—Strong Solution of Acetate of Iron, Solution of Ferric Acetate, Peracetate of Iron; $\text{Fe}_2(\text{C}_2\text{H}_3\text{O}_2)_6$.

Production.—By dissolving Ferric Hydrate in Glacial Acetic Acid and diluting.

Characters.—Dark-red liquid; smell acetous; taste acid and astringent. Miscible with water and spirit in all proportions.

Prescribing.—Strong Solution of Acetate of Iron is rarely used undiluted. It may be given in mixture. In administering these Liquors of Iron, all of which (except *Liq. Ferri Dialysatus*) are strongly acid and astringent, they should be largely diluted, and the mouth rinsed after each dose; or they may be given by means of a glass tube. The astringent and acid preparations are considered the most valuable; but it should be remembered that they are apt to derange digestion, and they should not be given when the stomach is empty.

Dose.—8 minims.

Incompatibles.—See Ferrous Sulphate.

Preparations.—*Liquor Ferri Acetatis* (1 strong liquor to 3 water). *Dose.*—30 minims.

Tinctura Ferri Acetatis (Strong Liquor, Acetic Acid, Spirit and Water—1 to 3). *Dose*.—30 minims.

Note that these two preparations are of the same strength, dose, and action.

Liquor Ferri Perchloridi Fortior—Strong Solution of Perchloride of Iron, Ferric Chloride; Fe_2Cl_6 .

Production.—By dissolving iron wire in Hydrochloric Acid and oxidizing with nitric acid.

Characters.—A dark orange-brown liquid; very astringent and acid to the taste. Miscible with spirit and water in all proportions.

Prescribing.—Strong solution of Perchloride of Iron is not used internally undiluted. It is very largely used externally as a styptic and astringent application, mixed with water or glycerine and painted on the part, or used in its undiluted state.

Incompatibles.—See *Ferri Sulphas*.

Preparations.—*Liquor Ferri Perchloridi*—Solution of Perchloride of Iron (1 part strong liquor to 3 water). *Dose*.—30 minims.

Tinctura Ferri Perchloridi, *Tinctura Ferri Sesquichloridi*—Tincture of Steel, 'Steel Drops' (1 part strong solution in 3 of spirit and water). *Dose*.—30 minims.

Note that these two preparations are identical in strength and dose. They are both very largely used, and are considered the most valuable forms of Iron. The liquor is the more satisfactory preparation of the two.

Liquor Ferri Dialysatus (see below).

Liquor Ferri Pernitratis—Solution of Pernitrate of Iron, Ferric Nitrate; Fe_26NO_3 .

Production.—By dissolving Iron in dilute Nitric Acid.

Characters.—Clear reddish-brown solution; slightly acid and astringent.

Prescribing.—As Liquor Ferri Perchlor. This preparation is very little used.

Dose.—40 minims.

Incompatibles.—See Ferri Sulphas.

Liquor Ferri Persulphatis—Solution of Persulphate of Iron, Ferric Sulphate; Fe_2SO_4 .

Production.—By dissolving Ferrous Sulphate in water and Sulphuric Acid, and oxidizing with Nitric Acid.

Characters.—Dense liquid; colour dark-red; no smell, and taste very astringent.

Prescribing.—This preparation is not used either internally or externally. Its use in the 'Pharmacopœia' is to produce Ferric Hydrate for the manufacture of the following

Preparations.—*Ferri et Ammonii Citras*, *Ferri et Quininae Citras*, *Ferri Peroxidum Hydratum*, *Ferrum Tartaratum*.

Liquor Ferri Dialysatus—Dialysed Solution of Iron.

Production.—Ferric Hydrate is dissolved in strong solution of Perchloride of Iron. The solution is placed in a vessel with a parchment-paper bottom. This vessel is floated on the surface of water in a larger vessel. On passing a stream of water into the small vessel, the acidulous and crystalline portion of the iron solution passes through the parchment diaphragm into the water below, leaving the liquid on the diaphragm nearly tasteless. This tasteless liquid is Liquor Ferri Dialysatus.

Characters.—A clear, dark, reddish-brown liquid, often gelatinous. Has no astringent or ferruginous taste. Neutral to test-paper. Miscible with water.

Prescribing.—Dialysed Solution of Iron may be ordered in drops, to be taken in water or in mixture. Possessing no taste or smell, it is useful for

delicate persons. Its activity and value as a medicine is much disputed. It may be used as an antidote to Arsenic poisoning.

Dose.—30 minims.

Incompatibles.—See Ferri Sulphas.

Ferri Peroxidum Hydratum—Peroxide of Iron, Ferri Sesquioxidum, Ferri Oxidum Rubrum, Hydrous Peroxide of Iron, Ferric Oxyhydrate, ' Salt of Steel,' ' Carbonate of Iron,' ' Rust of Iron'; $\text{Fe}_2\text{O}_3\text{H}_2\text{O}$, or $\text{Fe}_2\text{O}_3 \cdot 2\text{H}_2\text{O}$.

Production.—By precipitating Solution of Persulphate of Iron with Ammonia.

Characters.—A reddish-brown powder, with very little taste. Insoluble in water.

Prescribing.—Ferric Peroxide may be prescribed in powders or in pills. The former is the usual way, as it possesses so little taste. It is very largely used as a domestic medicine under the name of ' Salt of Steel.'

Dose.—30 grains.

Preparation.—*Emplastrum Ferri*—Chalybeate Plaster, ' Emp. Roborans ' (Peroxide of Iron, Burgundy Pitch, Lead Plaster—1 in 11). Largely used spread on leather to give mechanical support.

*12. **Ferri et Ammonii Citras**—Ammonio-Citrate of Iron, Citrate of Iron and Ammonia.

Production.—By dissolving freshly-precipitated Ferric Hydrate in Solution of Citric Acid, rendering alkaline with Ammonia, evaporating the solution to the consistency of syrup, spreading on glass plates, and drying.

Characters.—Deep-brown, thin, transparent scales. Taste sweetish and astringent. Slightly acid in reaction. Deliquescent. Soluble in water (2 in 1), insoluble in spirit.

Recognition.—The colour, general appearance, and sweet taste distinguish this ' scale compound.' It

much resembles Ferrum Tartaratum, but is much darker in colour, not so shining, and in larger scales. Ferrum Tartaratum has little sweet taste.

Prescribing.—Ferri et Ammonii Citras may be prescribed in solution; it is well to dissolve the salt before putting it into the bottle. Ferri Ammonii Citras belongs to the class of so-called 'scale compounds' of Iron. These contain the Iron in the *Ferric* state, yet, unlike other *Ferric* compounds, possess scarcely any astringent or acid properties. They are therefore very valuable for delicate persons. They may also be prescribed with alkalies.

Dose.—10 grains.

Incompatibles.—See Ferri Sulphas (except alkalies and their carbonates).

Preparation.—Vinum Ferri Citratis (8 grs. in 1 oz. Orange Wine). *Dose.*—4 drams.

*13. **Ferrum Tartaratum**—Ferri Potassio Tartras, Tartarated Iron.

Production.—By mixing freshly precipitated *Ferric Hydrate* with Acid Tartrate of Potassium, allowing the mixture to stand, dissolving in water, evaporating and drying on plates as before.

Characters.—Thin transparent scales, colour deep red. Taste very slightly sweetish and astringent. Soluble in water (1 in 4), insoluble in alcohol.

Recognition.—Note colour and general appearance. The scales are smaller than those of Ferri Ammonio Citras, much lighter in colour, and not so sweet.

Prescribing.—As Ferri Ammonio Citras.

Dose.—10 grains.

Incompatibles.—See Ferri Ammonio Citras.

*14. **Ferri et Quininæ Citras**—Citrate of Iron and Quinine.

Production.—By dissolving freshly precipitated Ferric Hydrate and freshly precipitated Quinine in Citric Acid, adding Ammonia, stirring and filtering, evaporating and 'scaling' as before.

Characters.—Greenish-golden yellow scales. Deliquescent. Bitter and ferruginous taste. Soluble in water (2 in 1), the solution slightly acid. Contains about 16 per cent. of Quinine.

Recognition.—The general appearance, colour, and bitter taste distinguish this substance from any other the student has to recognise.

Prescribing.—As Ferri Ammonio Citras.

Dose.—10 grains.

Incompatibles.—This preparation should not be prescribed with alkalies, which precipitate the Quinine. See also under Ferri Sulphas.

Pilula Ferri Iodidi—Pill of Iodide of Iron; FeI_2 .

Production.—By shaking Iron Wire and Iodine with water in a strong bottle until the froth becomes white. Filtering and mixing with powdered Sugar and Liquorice-root.

Characters.—A black mass.

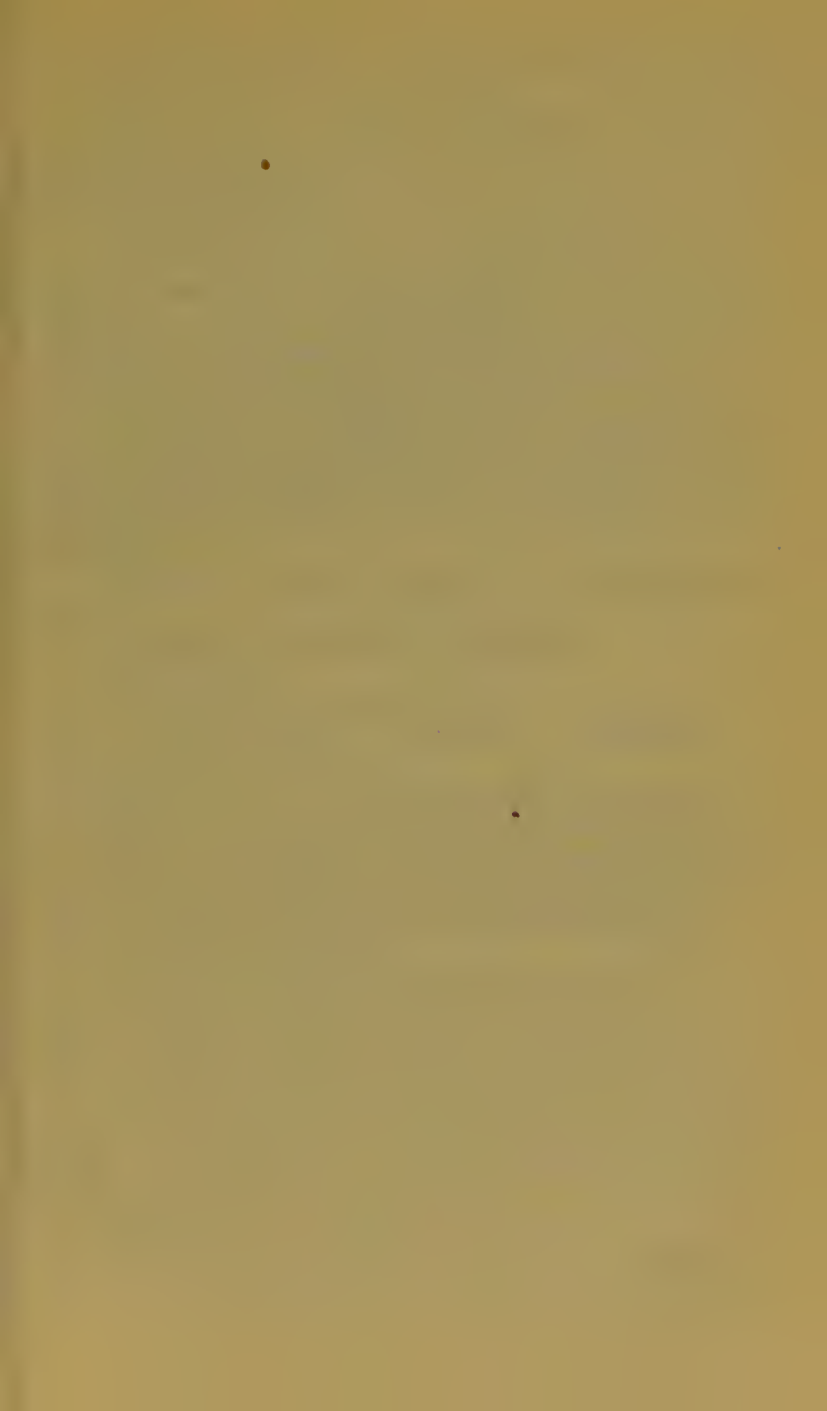
Prescribing.—In pills, which, if to be coated, should not be silvered. It is a preparation of doubtful value.

Dose.—8 grains.

Syrupus Ferri Iodidi—Syrup of Iodide of Iron.

Production.—By shaking Iodine and Iron Wire with water in a stout bottle until the froth becomes white, and filtering while hot into warm syrup. It contains 4·3 grains FeI_2 in 1 drachm.

Characters.—Slightly yellow or colourless syrup. Dense. Miscible with water in all proportions. Syrup of Iodide of Iron should be kept in bottles freely exposed to light. A piece of iron wire placed in it preserves it thoroughly.



Prescribing.—In mixture with water. It is a valuable preparation of Iodide of Iron, much to be preferred to the pill.

Dose.—60 minims.

Incompatibles.—Solutions containing Free Chlorine or much Acid, Lead and Mercuric Salts, Liq. Bismuthi. See also Ferri Sulphas.

Syrupus Ferri Subchloridi—Syrup of Subchloride of Iron, Syrup of Ferrous Chloride; FeCl_2 .

Production.—By dissolving iron wire in diluted Hydrochloric Acid, adding a little Citric Acid, filtering, and mixing the filtrate with syrup. The Citric Acid is used to preserve the solution from oxidation.

Characters.—A green syrup with a ferruginous taste.

Prescribing.—In mixture with water.

Dose.—1 dram.

Incompatibles.—See Ferri Sulphas.

*15. **Hydrargyrum** — Mercury, ' Quicksilver,' Argentum Vivum; Hg .

Characters and Recognition.—Mercury being the only fluid metal, and so largely used, needs no description. For medicinal purposes Mercury should be quite clean and dry. It may be cleaned by forcing through wash-leather, or passing through a pin-prick in a filter paper.

Prescribing.—Mercury is largely prescribed mixed with chalk and other substances. These preparations contain metallic Mercury, the globules of which should not be visible to the naked eye, but can be seen with the microscope. Mercurous Oxide is also generally present. Mercury may be given by inunction in the form of Mercurial Ointment.

Preparations (for Internal Use).—**Hydrargyrum cum Creta**—Mercury with Chalk, ' Grey Powder '

(1 part metallic Mercury, 2 parts Chalk; mix).
Dose.—8 grains.

Pilula Hydrargyri—'Blue Pill,' Mercurial Pill (Mercury 2, Confection of Roses 3, Liquorice-root 1). *Dose*.—8 grains.

Note that these two preparations of metallic Mercury have the same strength and dose.

Preparations (for External Use).—*Emplastrum Hydrargyri*—Mercurial Plaster (Mercury, Olive Oil, Sulphur, Lead Plaster—1 in 3).

Emplastrum Ammoniaci cum Hydrargyro (Mercury, Ammoniacum, Olive Oil, Sulphur—1 in 5).

Linimentum Hydrargyri—Mercurial Liniment (Ointment of Mercury, Ammonia, Liniment of Camphor—1 in 6).

Suppositoria Hydrargyri—Mercurial Suppositories (Ointment of Mercury, Oil of Theobroma—1 in 6).

Unguentum Hydrargyri—Mercurial Ointment, 'Blue Ointment' (Mercury, Lard, and Suet—1 in 2).

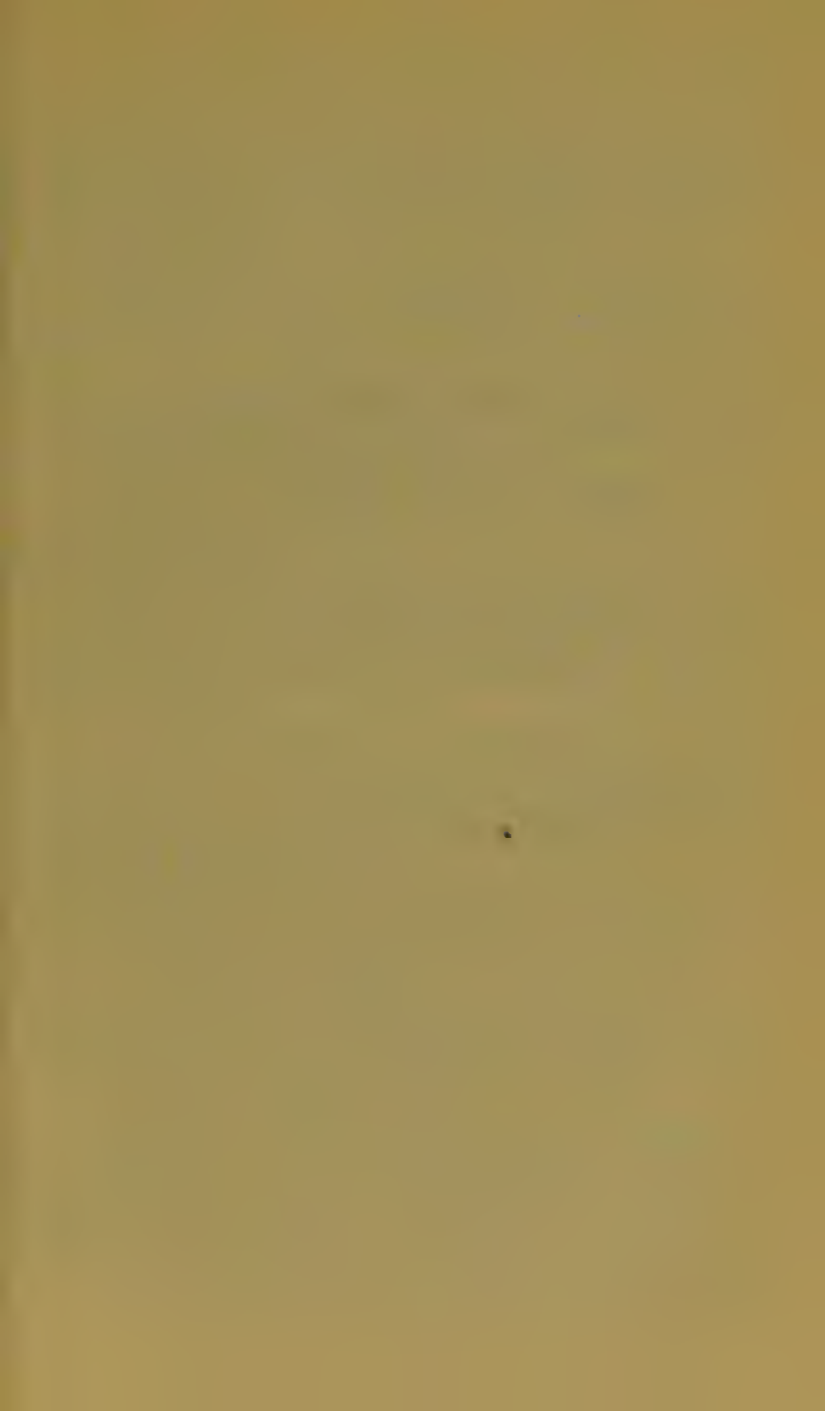
Unguentum Hydrargyri Compositum—Compound Mercurial Ointment, 'Scott's Ointment' (Ointment of Mercury, Yellow Wax, Olive Oil, Camphor—1 in $4\frac{1}{2}$).

*16. *Hydrargyri Oxidum Flavum*—Yellow Oxide of Mercury, Mercuric Oxide; HgO .

Production.—By mixing solutions of Mercuric Chloride and Caustic Soda, and collecting and drying the precipitate.

Characters.—A bright orange-yellow powder; insoluble in water; amorphous.

Recognition.—The bright orange-yellow colour and non-crystalline nature of this salt, together with its weight, serve to distinguish it. It has no smell. The student must remember that this substance is identical in composition with Red Oxide of Mercury, which is crystalline.



Prescribing.—Yellow Oxide of Mercury is rarely given internally. It is largely used in the form of ointment, and owing to its amorphous nature is preferable for this purpose to the Red Oxide.

Dose.—1 grain.

Preparation.—*Oleatum Hydrargyri*—Oleate of Mercury (Yellow Oxide of Mercury 1, Oleic Acid 9; mix).

*17. *Hydrargyri Oxidum Rubrum*—Red Oxide of Mercury, Mercuric Oxide, 'Red Precipitate,' Hydrargyri Nitrico-oxidum; HgO .

Production.—By heating Mercuric Nitrate.

Characters.—In orange-red, shining crystals, insoluble in water.

Recognition.—The peculiar orange-red colour and the shape of the small crystals distinguish this compound. Its weight should also be noted. This compound is identical in composition with the Yellow Oxide.

Prescribing.—Red Oxide of Mercury is rarely used internally. Largely used in the form of ointment. For this purpose the crystals must be rubbed to the finest powder (levigated) before the ointment basis is added.

Dose.—1 grain.

Preparations.—*Ung. Hydrargyri Oxidi Rubri*—'Red Precipitate Ointment' (62 grains oxide in 1 oz. hard and soft paraffin).

*18. *Hydrargyri Subchloridum*—Subchloride of Mercury, Calomelas, Hydrargyri Chloridum, 'Calomel,' Mercurous Chloride; HgCl .

Production.—By subliming a mixture of Mercury, Persulphate of Mercury, and Chloride of Sodium.

Characters.—Very heavy, dull white or slightly yellow powder. Not crystalline. Insoluble in water, spirit, or ether. Nearly tasteless.

Recognition.—The great weight, dull appearance,

and non-crystalline nature of the salt distinguish Calomel. The student must be most careful to distinguish 'Calomel,' Mercurous Chloride, from 'Corrosive Sublimate,' Mercuric Chloride.

Calomel is non-crystalline, insoluble in water, ether, or spirit. *Dose.*—5 grains.

Corrosive Sublimate is crystalline, soluble in water, spirit, and ether. *Dose.*— $\frac{1}{8}$ grain.

Prescribing.—Calomel may be prescribed in pills or in powders. Both forms are equally used. It may also be given by fumigation. It is used externally in ointment and in powder.

Dose.—5 grains.

Preparations.—*Lotio Hydrargyri Nigra*—'Black Wash' (Calomel 3 grs., Lime-water 1 oz.); contains Mercurous Oxide.

Pilula Hydrargyri Subchloridi Composita—'Plummer's Pill' (Calomel, Sulphurated Antimony, Guaiacum Resin, Castor Oil—1 in 5).

Unguentum Hydrargyri Subchloridum—Calomel Ointment (Calomel 8 grs., Benzoated Lard 1 oz.).

*19. **Hydrargyri Perchloridum**—Hydrargyrum Corrosivum Sublimatum, Hydrargyri Bichloridum, 'Corrosive Sublimate,' Mercuric Chloride; HgCl_2 .

Production.—By subliming a mixture of Persulphate of Mercury, Chloride of Sodium, and Black Oxide of Manganese.

Characters.—Very heavy, colourless, prismatic crystals. Soluble in water (1 in 20), more so in ether (1 in 6), and in spirit (1 in 5). Very easily powdered; the powder exceedingly irritating to the nostril. Highly poisonous.

Recognition.—The great weight and peculiar crystalline appearance distinguish Corrosive Sublimate. The crystals when freshly broken, present a peculiar glassy appearance. Arsenic has the same peculiarity, but its crystals are quite different in

shape and size (being much smaller), or it (Arsenic) is in large vitreous masses.

Corrosive Sublimate must be very carefully distinguished from Calomel. Its properties, physical and medicinal, are entirely different.

Prescribing.—Mercuric Chloride may be prescribed in pills. Not less than 1 grain should be weighed (on paper or a glass scale-pan), well mixed with some inert substance, such as sugar of milk, and the mass divided by weighing, so that each pill contains the dose required. Mercuric Chloride is given in solution by means of the official liquor. It is also very largely used as an antiseptic. Knives and metallic substances decompose the salt, and should not be placed in contact with it. Baths containing Mercuric Chloride are also ordered.

Dose.— $\frac{1}{8}$ grain.

Incompatibles.—Albumen, Decoction of Bark, Soaps, Acetate of Lead, Nitrate of Silver, Tartar Emetic, Alkalies and their Carbonates, Iodide of Potassium, Lime-water, Antipyrin.

Preparations.—*Liquor Hydrargyri Perchloridi*—Solution of Perchloride of Mercury (Mercuric Chloride and Ammonium Chloride, of each $\frac{1}{2}$ grain in 1 oz. of water). *Dose.*—2 drams.

The Chloride of Ammonium is introduced to prevent decomposition of the Mercuric Chloride. It is not necessary. Notice the dose of this preparation.

Lotio Hydrargyri F'lora—'Yellow Wash' (Corrosive Sublimate 36 grains in 1 pint Lime-water); contains yellow Mercuric Oxide.

Corrosive Sublimate is used in making Red Iodide of Mercury and Ammoniated Mercury.

*20. **Hydrargyrum Ammoniatum**—Ammoniated Mercury, 'White Precipitate,' Hydrargyri Ammonio Chloridum, Chloride of Mercuric Ammonium; NH_2HgCl .

Production.—By pouring solution of Perchloride of Mercury into solution of Ammonia and collecting the precipitate.

Characters.—In opaque white masses or powder ; insoluble in water, spirit, and ether.

Recognition.—White Precipitate in lumps may be recognised by its peculiar appearance ; it is the only substance in white opaque masses without smell and not crystalline which has to be recognised. In powder note that it is very dry in appearance, and not so heavy as Calomel. Its recognition in either state requires some practice.

Prescribing.—Not used internally. Largely used in the form of ointment and in powder, for external application.

Preparation.—*Unguentum Hydrargyri Ammoniati*—'White Precipitate Ointment,' Ointment of Ammoniated Mercury (Ammoniated Mercury 1, Simple Ointment 9).

*21. *Hydrargyri Iodidi Rubrum*—Red Iodide of Mercury, *Hydrargyri Biniodidum*, Mercuric Iodide ; HgI_2 .

Production.—By mixing solution of Mercuric Chloride and Iodide of Potassium and collecting the precipitate.

Characters.—In minute vermilion crystals or powder, becoming yellow when gently heated, the colour returning when the powder is rubbed. Insoluble in water, slightly soluble in alcohol, freely in ether and in solution of Iodide of Potassium.

Recognition.—The brilliant scarlet colour of the salt at once identifies it. Notice the difference in appearance from Red Mercuric Oxide.

Prescribing.—Mercuric Iodide may be prescribed in pill, using the same method as in dispensing Mercuric Chloride (see above). A very common way of ordering it is in association with Iodide of

Potassium, in solution of which salt it is freely soluble. It is also used in ointment externally.

Dose.— $\frac{1}{8}$ grain.

Preparations.—*Liquor Arseniei et Hydrargyri Iodidi*—' Donovan's Solution,' Liquor Donovanii, Solution of Iodide of Arsenium and Mercury (1 per cent. each of Iodides of Arsenium and Mercury).

Dose.—50 minims (see *Arsenii Iodidum*).

Unguentum Hydrargyri Iodidi Rubri—Ointment of Red Iodide of Mercury (16 grs. Red Iodide in 1 oz. Simple Ointment).

Liquor Hydrargyri Nitratis Acidus—Acid Solution of Nitrate of Mercury, Acid Solution of Pernitrate of Mercury.

Production.—By dissolving Mercury in diluted Nitric Acid.

Characters.—A colourless and very strongly acid liquid. Highly caustic, and stains the skin dark brown.

Prescribing.—Not used internally. It is used externally as a caustic application to warts, etc., applied with a glass brush or rod.

Unguentum Hydrargyri Nitratis—Ointment of Nitrate of Mercury, ' Citrine Ointment.'

Production.—By dissolving Mercury in Nitric Acid by the aid of heat, and pouring the solution into a hot mixture of lard and oil.

Characters.—A tenacious bright-yellow ointment with a nitrous smell. Citrine Ointment must not be stirred or handled with metal knives. It is often of a brown colour from long keeping.

Preparations.—*Unguentum Hydrargyri Nitratis Dilutum*—Diluted Ointment of Nitrate of Mercury (1 part Strong Ointment to 2 parts Soft Paraffin).

*22. *Iodum*—Iodinum, Iodine; I_2 .

Production.—An elementary substance prepared from the ashes of Seaweed.

Characters.—In masses or laminar crystals, with a metallic lustre, emitting a peculiar and suffocating odour and a violet vapour when heated. Slightly soluble in water (1 in 7,000), soluble in rectified spirit (1 in 12), in ether (1 in 4), sparingly in glycerine. Very soluble in solutions of Iodide of Potassium and Chloride of Sodium.

Recognition.—Iodine is at once recognised by its peculiar metallic lustre and its suffocating and distinctive odour.

Prescribing.—Iodine is rarely prescribed in its free state; the tincture is the form to be employed when free Iodine is to be given. Iodine is very largely used externally, in solution, with Iodide of Potassium, and in ointments. The vapour is also administered by inhalation. Iodine and its solutions should be kept in stoppered bottles, and not placed in contact with metallic or organic matter. It stains the skin brown.

Dose.— $\frac{1}{2}$ grain.

Incompatibles.—Alkaloids, Antipyrin, Mineral Acids, Metallic Salts, Ammonia, Hyposulphite of Sodium.

Preparations.—*Linimentum Iodi* (Iodine, Iodide of Potassium, Glycerine, Spirit—1 in 9 $\frac{1}{2}$).

Liquor Iodi (Iodine, Iodide of Potassium, Water—1 in 20).

Tinctura Iodi (Iodine, Iodide of Potassium, Spirit—1 in 40). *Dose.*—20 minims.

Note the strength of these solutions. The Iodide of Potassium simply acts as a solvent for the Iodine.

Vapor Iodi (*Tinctura Iodi* 1 dram, Water 1 oz. = 1 inhalation).

Unguentum Iodi (Iodine, Iodide of Potassium, Glycerine, Lard—16 grains Iodine in 1 oz.).

Iodoform (contains about 90 per cent. Iodine; see Part II.).

*23. **Potassii Iodidum**—Iodide of Potassium ; KI.

Production.—By treating solution of Potash with Iodine, evaporating, heating with charcoal, dissolving in water, and crystallizing.

Characters.—Colourless, opaque, cubical crystals, sometimes with a little odour of Iodine. Soluble in water (4 in 3), less soluble in spirit. Solutions should not be exposed to light.

Recognition.—The peculiar cubical appearance of the salt usually distinguishes it. It has also frequently a faint odour of Iodine. The crystals are generally larger and more distinctly cubical than those of Potassii Bromidum (q. v.).

Prescribing.—Potassii Iodidum is given in solution, usually with a vegetable bitter. It should not be ordered on an empty stomach.

Dose.—20 grains.

Incompatibles.—Preparations containing Free Chlorine or much Acid, Lead and Mercuric Salts, Spirit of Nitrous Ether (unless quite neutral).

Preparations.—All preparations of Iodine. *Lini-mentum Potassii Iodidi cum Sapone* (Potassii Iodidum, Curd Soap, Glycerine, Oil of Lemon—a stiff jelly— $54\frac{1}{2}$ grains in 1 oz.).

Unguentum Potassii Iodidi (Iodide of Potassium, Carbonate of Potash, Water, Benzoated Lard—1 in $8\frac{3}{4}$).

The Carbonate of Potassium prevents the ointment from turning yellow on keeping.

Sodii Iodidi—Iodide of Sodium ; NaI.

Production.—By the same process as Potassium, Caustic Soda being used instead of Potash.

Characters.—Dry, white, crystalline powder. Deliquescent. Taste saline and bitter. Soluble in water and in spirit.

Prescribing.—As Potassium Iodide.

Dose.—10 grains.

Incompatibles.—Those of Potassium Iodide.

Plumbi Iodidum—Iodide of Lead, Plumbic Iodide; $\text{Pb}(\text{NO}_3)_2$.

Production.—By mixing solution of Nitrate of Lead and Iodide of Potassium, and collecting the precipitate.

Characters.—Brilliant yellow powder or crystalline scales. No smell or taste. Insoluble in cold water, soluble in hot.

Prescribing.—Not used internally. Used in the form of ointment and plaster externally.

Preparations.—*Emplastrum Plumbi Iodidi*—Iodide of Lead Plaster (Iodide of Lead, Resin, Lead Plaster—1 in 10).

Unguentum Plumbi Iodidi (Iodide of Lead, Simple Ointment—1 in 8).

*24. **Magnesii Sulphas**—Sulphate of Magnesia, 'Epsom Salts'; $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$.

Production.—By dissolving Magnesian Limestone ('Dolomite') in dilute Sulphuric Acid, filtering, and crystallizing.

Characters.—Small, colourless, and transparent needles. Taste bitter and nauseous. Soluble in water (10 in 13), insoluble in spirit.

Recognition.—Epsom Salts are easily distinguished by the characteristic appearance of the crystals. The appearance of Sulphate of Zinc is very similar, but the two salts usually present the following points of difference:

Sulphate of Magnesia is usually slightly damp, the crystals more or less coherent, and never powdery or opaque on the outside.

Sulphate of Zinc is usually dry, the crystals less coherent, and, if the salt has been much exposed to the air, the crystals are opaque and powdery on the outside.

Chemical tests, of course, at once distinguish them.

Prescribing.—Epsom Salts are usually prescribed in solution; the taste is very nauseous, but is entirely covered by Liquorice. An aromatic or carminative should be combined with them to prevent griping.

Dose.—4 drams.

Incompatibles.—Nitrate of Silver, Alkaline Carbonates, Lime-water, Acetate of Lead, Alcohol.

Preparations.—*Enema Magnesii Sulphatis* (Sulphate of Magnesia 1, Olive Oil 1, Starch Mucilage 15 = 1 enema).

Mistura Sennæ Composita—'Black Draught' (1 in 5 Epsom Salts). (See Senna, Part II.)

Magnesii Sulphas Effervescens—Effervescent Sulphate of Magnesia (Sulphate of Magnesia, Bicarbonate of Sodium, Tartaric and Citric Acids, Sugar—1 in 2); Granular. *Dose.*—1 oz.

Magnesii Carbonas—Carbonate of Magnesia (MgCO_3), $\text{Mg}(\text{HO})_2 \cdot 4\text{H}_2\text{O}$.

Production.—By mixing together either cold or boiling solutions of Sulphate of Magnesia and Carbonate of Sodium, and collecting the precipitate.

Characters.—The student should remember that there are two Carbonates of Magnesia in the 'Pharmacopœia'—*Light Carbonate of Magnesia* (made with cold solutions), *Heavy Carbonate of Magnesia* (made with hot solutions). These are identical in chemical composition, dose, activity, and medicinal action. They simply differ in their bulk. The ratio of bulks for the same weight is as 1 to 3½. The heavy Carbonate is to be preferred for medicinal use.

In white powder, granular or slightly crystalline; very little soluble in hot or cold water (1 in 9,000 and 1 in 2,493).

Prescribing.—Carbonate of Magnesia may be pre-

scribed in dry powder or in water. In making mixtures, the heavy Carbonate needs only to be placed in the water and the bottle shaken. It may be used to roll pills in.

Dose.—60 grains.

Incompatibles.—Acids.

Preparations (of *Magnesii Carbonas Levis*).—*Vapor Olei Pini Sylvestris* (*Oleum Pini Sylvestris* 40 minims, *Magnesia* 20 grains, *Water* 1 oz.—1 dram for inhalation).

(Of *Magnesii Carbonas Ponderosa*).—*Liquor Magnesii Carbonatis*—'Fluid Magnesia' (by dissolving freshly made Carbonate of Magnesia in water by means of Carbonic Acid Gas under pressure—10 grains of Carbonate of Magnesia in 1 oz.). *Dose.*—2 oz.

Trochisci Bismuthi—Bismuth Lozenges (2½ grs. in each).

Liquor Magnesii Citratis—Effervescing Solution of Citrates of Magnesium and Potassium (Carbonate of Magnesium, Citric Acid, Syrup of Lemons, Bicarbonate of Potassium, in crystals, *Water*—in soda-water bottle). *Dose.*—10 oz.

Magnesia—Calcined Magnesia, Oxide of Magnesia; MgO .

Production.—By calcining either light or heavy Magnesia. There are thus two *Magnesias*, as there are two Carbonates—*Magnesia Levis*, from the light Carbonate; *Magnesia Ponderosa*, from the heavy Carbonate. These are identical in all respects but bulk, the ratio of bulk for the same weight being as that for Carbonates. White powders, nearly insoluble in water. (See Carbonates of Magnesia.)

Prescribing.—As Carbonates of Magnesia.

Dose.—60 grains.

Preparation.—*Pulvis Rhei Compositus*—'Gre-

gory's Powder,' Compound Rhubarb Powder (Rhubarb 2, Magnesia 6, Ginger 1). *Dose*.—60 grains.

This may be made with either light or heavy Magnesia. The heavy produces the most convenient powder.

*25. **Phosphorus**—Phosphorus; P_4 .

Production.—Prepared from Bone-ash by purification and distillation with Charcoal.

Characters.—In white or slightly yellow sticks, kept in water. When freshly cut, surface shining and waxy. Luminous in the dark. Exceedingly inflammable. Insoluble in water; soluble in Ether, Bisulphide of Carbon, Fixed Oils, Naphtha, and hot Turpentine.

Recognition.—Phosphorus is at once recognised by its characteristic fumes, great inflammability, and luminous appearance in the dark. Very old samples are frequently red on the outside.

Prescribing.—Phosphorus may be prescribed in pills; for this purpose, not less than 1 grain should be weighed (on paper or a glass scale-pan), dried with a piece of blotting-paper, and dissolved in pure Carbon Disulphide or in Ether. The solution may be mixed with sugar of milk and any inert powder, and divided into pills, so that each contains the required dose. They should be varnished. If sufficient powder be used, the solution will not take fire. Phosphorus may also be given in the form of Oleum Phosphoratum, in pills or capsules. The Pharmacopœial pill-mass is a preparation of doubtful value.

Dose.— $\frac{1}{2}$ grain.

Preparations.—Oleum Phosphoratum—Phosphorized Oil (Phosphorus, Almond Oil, heated to 300° and filtered—1 per cent.). *Dose*.—10 minims.

Pilula Phosphori (Phosphorus, Balsam Tolu,

Yellow Wax, Curd Soap—3 grains contain $\frac{1}{30}$ grain).
Dosc.—4 grains.

Acidum Phosphoricum Concentratum—Concentrated Phosphoric Acid; H_3PO_4 .

Production.—By oxidizing Phosphorus with Nitric Acid.

There are two strengths of this acid in the ' Pharmacopœia ' :

Acidum Phosphoricum Concentratum. *Dosc.*—5 minims.

Acid. Phosphoricum Dilutum. *Dosc.*—30 minims.

The latter is the preparation always used.

Both are colourless liquids, the Concentrated Acid being of syrupy consistency.

Prescribing.—Acid. Phosph. Dil. is prescribed in mixture; it is a useful solvent for Sulphate of Quinine, and is largely used in combination with that drug.

Incompatibles.—Calcium Salts, Carbonates.

Calci Phosphas—Phosphate of Calcium, Phosphate of Lime; $\text{Ca}_3(\text{PO}_4)_2$.

Production.—By precipitating a solution of Acid Phosphate of Calcium with Ammonia.

Characters.—A white amorphous powder; insoluble in water. Tasteless.

Prescribing.—Calcium Phosphate may be prescribed in powders, or in small doses in pills. It is largely given in combination with other Phosphates. ' Parrish's Chemical Food ' (Syr. Ferri Phosph. Co.) contains Phosphate of Iron, Lime, Soda, and Potassium. It is very largely used.

Dose.—20 grains.

Preparation.—*Pulvis Antimonialis*—Antimonial Powder, substitute for ' James's Fever Powder,' *Pulv. Jacobi* (Oxide of Antimony 1, Calcium Phosphate 2). *Dose.*—5 grains.

*26. **Ferri Phosphas**—Phosphate of Iron (47 per cent.); $\text{Fe}_3(\text{PO}_4)_2 \cdot 8\text{H}_2\text{O}$.

Production.—By mixing solutions of Ferrous Sulphate, Sodium Phosphate, and Sodium Bicarbonate, and collecting the precipitate.

Characters.—A slate-blue amorphous powder, insoluble in water.

Recognition.—The slate-blue colour, and non-crystalline nature distinguish this salt. Students should be careful to distinguish it from Arseniate of Iron, which is green.

Prescribing.—Ferrous Phosphate is prescribed in pills or Syrup. (See Calcium Phosphate.)

Dose.—10 grains.

Preparation.—*Syrupus Ferri Phosphatis*—Syrup of Phosphate of Iron (freshly made Phosphate of Iron dissolved in strong Phosphoric Acid, and Sugar added—1 grain in 1 dram). *Dose*.—1 dram.

Sodii Phosphas—Phosphate of Sodium ;



Production.—By neutralizing solution of Acid Phosphate of Calcium with Carbonate of Sodium, filtering and crystallizing.

Characters.—Transparent colourless crystals. Efflorescent. Tastes like common salt. Soluble in water (1 in 5).

Prescribing.—Sodium Phosphate is prescribed in solution. It is often given to children, and may be combined with Dill Water or Peppermint.

Dose.—1 oz.

Incompatibles.—Sulphate of Magnesia, Nitrate of Silver.

Preparation.—*Sodii Phosphas Effervescens* (Granular 1 in 2). *Dose*.— $\frac{1}{2}$ oz.

Calcii Hypophosphis—Hypophosphite of Calcium, Hypophosphite of Lime ; $\text{Ca}(\text{PH}_2\text{O}_2)_2$.

Production.—By heating Phosphorus with slaked

Lime and Water, filtering, separating uncombined lime and crystallizing.

Characters.—White pearly crystals. Taste nauseous and bitter. Soluble in water (1 in 8); insoluble in spirit.

Prescribing.—Hypophosphite of Calcium is prescribed in solution. Syrups containing Hypophosphites are largely used. The salt is considered as a useful means of exhibiting Phosphorus.

Dose.—10 grains.

Incompatibles.—Permanganate of Potassium, Nitrate of Silver.

Sodii Hypophosphis—Hypophosphite of Sodium; NaPH_2O_2 .

Production.—By mixing solutions of Hypophosphite of Calcium and Carbonate of Sodium, filtering, and evaporating the filtrate.

Characters.—A white granular salt, very much resembling Hypophosphite of Calcium; but deliquescent, and more soluble in water (1 in 2); soluble in spirit.

Prescribing.—As *Calcis Hypophosphis*.

Dose.—10 grains.

Incompatibles.—As *Calcis Hypophosphis*.

***27. Plumbi Oxidum**—Oxide of Lead, 'Litharge'; PbO .

Production.—By roasting lead in air.

Characters.—Heavy scales or powder, of a pale brick-red colour. Insoluble in water.

Recognition.—The weight, colour, and non-crystalline appearance distinguish this salt. The student must be careful not to confound it with Red Oxide of Mercury, which is crystalline.

Prescribing.—Not used internally. Sometimes used in lotions and ointments.

Preparations.—*Emplastrum Plumbi*—Lead Plaster, 'Adhesive Plaster,' 'Diachylon Plaster,'

' Strapping ' (Oxide of Lead, Olive Oil, Water, boiled together until a plaster is formed).

This consists of a lead soap, Oleate of Lead. It is very largely used, and is contained in most other plasters.

Emplastrum Saponis Fuscum—Emp. Cerati Saponis, ' Soap Plaster ' (Oxide of Lead, Yellow Wax, Olive Oil, Vinegar, Water).

*28. **Plumbi Acetas**—Acetate of Lead, ' Sugar of Lead ' ; $\text{Pb}(\text{C}_2\text{H}_3\text{O}_2)_2 \cdot 3\text{H}_2\text{O}$.

Production.—By dissolving Oxide of Lead in Acetic Acid and crystallizing.

Characters.—In colourless crystals, or in white crystalline masses having an acetous smell. Slightly efflorescent. Taste sweet and astringent. Soluble in water (1 in $2\frac{1}{2}$).

Recognition.—Note that the substance is white, crystalline, and has a peculiar acetous smell. No salt to be recognised has the same smell.

Prescribing.—Acetate of Lead may be prescribed in solution or in pills. It is important that the water used for its solution be distilled water, and free from CO_2 , otherwise a milky mixture results. Acetate of Lead is used externally in lotions and ointments.

Dose.—4 grains.

Incompatibles.—Vegetable astringent substances, preparations of Opium, Vegetable Acids, and Albuminous Liquids, Common Water, Mineral Acids and Salts, Alkalies, and Iodide of Potassium.

Preparations.—*Glycerinum Plumbi Subacetatis* (Acetate of Lead, Oxide of Lead, Glycerine and Water, boiled and evaporated).

Unguentum Glycerini Plumbi Subacetatis (Glycerine of Subacetate of Lead, Hard and Soft Paraffin—1 in 38).

Pilula Plumbi cum Opio—Pill of Lead and Opium (Acetate of Lead 6, Opium in powder 1, Confection of Roses 1—1 Opium in 8, 6 Lead Acetate in 8).
Dose.—5 grains.

Suppositoria Plumbi Composita — Compound Lead Suppositories (Acetate of Lead, Opium, Oil of Theobroma—3 grains Lead, 1 grain Opium in each).

Unguentum Plumbi Acetas (12 grains in 1 oz. Benzoated Lard).

Liquor Plumbi Acetatis—Solution of Subacetate of Lead, 'Goulard Extract'; $\text{Pb}_2\text{O}(\text{C}_2\text{H}_3\text{O}_2)_2$ (21 per cent.).

Production.—By boiling Acetate of Lead, Oxide of Lead and water together and filtering.

The student must distinguish the Basic Subacetate of Lead which this solution contains from ordinary Acetate of Lead.

Characters.—A dense, clear, colourless liquid. Alkaline; becomes turbid on exposure to air.

Prescribing.—Not used internally. It is very largely used, diluted with water, in lotions. The water must be distilled, and free from CO_2 , if a clear mixture is desired. Lotions made with common water, however, are largely used. Such should be labelled, 'Shake the bottle.'

Incompatibles.—Acacia Mucilage and the bodies mentioned under *Plumbi Acetas*.

Preparation.—*Liquor Plumbi Subacetatis Dilutus* —'Goulard's Lotion' (Solution of Acetate of Lead 2 drams, Spirit 2 drams, Distilled Water to 1 pint).

The spirit serves to expel CO_2 , and should be mixed with the water first.

Potassii Bicarbonate—Bicarbonate of Potassium, Acid Carbonate of Potassium, Hydrogen Potassium Carbonate; KHCO_3 .

Production.—By saturating a strong solution of

Potassium Carbonate with Carbonic Acid Gas, and re-crystallizing the salt that separates.

Characters. — Colourless crystals, but nearly always used in medicine in powder. Powder damp, coherent, granular, with a saline taste. Soluble in water (1 in 4).

Prescribing. — Potassium Bicarbonate can be ordered in solution, or in powders to be dissolved in water. In prescribing effervescing mixtures with Citric or Tartaric Acid, it is useful to remember that 20 grains neutralize 14 of Citric, 15 of Tartaric Acid.

Dose.—40 grains.

Incompatibles.—Acids, Subnitrate of Bismuth, Perchloride of Mercury, Syrup of Lemons, and Squills.

Preparation. — *Liquor Potassæ Effervescens* — 'Potash Water' (30 grains Potas. Bicarb. in 1 pint Water, with CO₂ Gas under pressure). *Dose.*—Ad libitum.

Potassii Chloras — Chlorate of Potassium ; KClO₃.

Production.—By passing Chlorine into a mixture of slaked Lime, Carbonate of Potassium and water ; boiling, filtering, and evaporating.

Characters.—Colourless crystalline plates, but always used in powder. The powder is granular and lumpy. Taste cool and saline. Soluble in water (1 in 16).

Prescribing.—Chlorate of Potassium may be given internally in solution. It is very largely used in gargles. Useful forms for making use of its local action are pellets of the compressed salt or lozenges.

Dose.—30 grains.

Incompatibles.—Chlorate of Potassium in the dry state must not be rubbed down with Sulphur

or Sugar. The mixture with sugar is highly inflammable and explosive. *Incompatible* with strong acids.

Potassa Caustica—Caustic Potash, Potassa, Hydrate of Potash.

Production.—By boiling together Carbonate of Potash, slaked Lime and Water, filtering, evaporating, and fusing.

Characters.—In white opaque lumps or sticks. Very deliquescent and corrosive.

Prescribing.—Caustic Potash is given internally in solution (see Liq. Potassæ). Externally it is sometimes used as a caustic rubbed on the skin.

Incompatibles.—Iron and metallic salts, Solutions of Bismuth, Sulphate of Magnesia, Infusion of Roses, and most organic matter.

Liquor Potassæ—Solution of Potash.

Production.—By boiling together a mixture of Carbonate of Potash, slaked Lime and Water, and filtering.

Characters.—A colourless liquid. Very alkaline, feeling soapy when rubbed between the fingers.

It contains 27 grains of Caustic Potash in 1 oz.

Prescribing.—Liquor Potassæ is prescribed in mixtures. Each dose of the solution should be well diluted before administration.

Liquor Potassæ cannot be filtered through paper, Asbestos is the best medium. It must be kept in stoppered bottles.

Dose.—60 minims.

Incompatibles.—See Caustic Potash.

Potassii Sulphas—Sulphate of Potash; K_2SO_4 .

Production.—By neutralizing Acid Sulphate of Potassium with Carbonate of Potassium.

Characters.—Colourless hard prisms, but always used in powder. The particles of the salt in powder are very hard, and are useful for grinding vegetable

Characters.—In dark purple prisms, with a peculiar lustre. When moistened, yields a rich purple colour. Rapidly decomposed by organic matter, becoming brown. Soluble in water (1 in 16).

Recognition.—The dark lustrous purple colour of the dry salt, and the magnificent colour when moistened, at once distinguish this salt. No other substance resembles it.

Prescribing.—Permanganate of Potassium may be given internally in pill or solution. The former is preferable, on account of its nauseous taste. The salt is rapidly decomposed by organic matter, hence the pills must not be made up with Glycerine or similar excipient. Ointment of Resin, Vaseline, or Fuller's Earth and water may be used. The pills should be varnished.

Permanganate of Potassium is largely used in solution as an antiseptic and disinfectant. It acts by oxidation. It is contained in 'Condy's Fluid.' Solutions should not be filtered through paper, or kept in corked bottles.

Dose.—5 grains.

Incompatibles.—Acids, Organic Matter, and all Easily Oxidizable Substances, Spirit, Glycerine.

Preparation.—*Liquor Potassii Permanganatis*—Solution of Permanganate of Potassium (4 grs. in 1 oz.). *Dose.*—4 drams.

Sodii Bicarbonas—Bicarbonate of Sodium ;



Production.—By saturating Carbonate of Sodium with Carbonic Acid Gas.

Characters.—A damp white powder. Taste saline, not unpleasant. Soluble in water (1 in 10).

Prescribing.—Sodium Bicarbonate is very largely used in solution. It may also be given in powders, to be dissolved in water ; or in pellets, to be swallowed. For convenience in ordering effervescing

mixtures, remember that 20 grains neutralize 16·7 grains of Citric, 17·8 grains of Tartaric Acid.

When 'Sodæ Carb.' is ordered in prescriptions for internal use Bicarbonate is generally intended. The student should remember the difference between the two salts.

Dose.—60 grains.

Incompatibles.—Acids, Perchloride of Mercury.

Preparations.—*Liquor Sodæ Effervescens*—'Soda Water' (30 grains Bicarbonate of Soda in 1 pint of water, with CO_2 , under pressure). *Dose.*—Ad libitum.

Sodii Citro-tartras Effervescens—Effervescing Citro-tartrate of Soda (Sodii Bicarb., Tartaric Acid, Citric Acid, Sugar. In Granules). *Dose.*— $\frac{1}{4}$ oz.

Trochisci Sodii Bicarbonatis (5 grains in each). *Dose.*—6.

Sodii Bicarbonate is also contained in :

Pulvis Sodæ Tartarata Effervescens—'Seidlitz Powder' (Sodii Bicarb. 1, Soda Tart. 3—1 in 4).

Borax—*Sodæ Biboras*—Pyroborate of Sodium; $\text{Na}_2\text{B}_4\text{O}_7, 10\text{H}_2\text{O}$.

Production.—Occurs native. Also by boiling together Boric Acid and Carbonate of Sodium.

Characters.—In large transparent, colourless crystals; always used in powder. Taste saline. Soluble in water (1 in 22), in glycerine (1 in 1). Insoluble in spirit. A mild alkali.

Prescribing.—Borax may be given internally in solution; it is not much used in this way. It is largely used as a local application, dissolved in glycerine, or mixed with honey, or in the dry state.

Dose.—40 grains.

Incompatibles.—Acids, Mucilage of Acacia.

Preparations.—*Mel Boracis*—Honey and Borax

(Borax in powder 2, Glycerine 1, Honey 16—1 in 9).

Glycerinum Boracis (Borax 1, Glycerine 4, Water 2—1 in 7).

Sodii Nitris—Nitrite of Sodium; NaNO_2 .

Production.—By heating Nitrate of Sodium.

Characters.—White or yellowish crystalline salt, very soluble in water. Deliquescent.

Prescribing.—Nitrite of Sodium may be prescribed in solution. It should be carefully noticed that this salt in large doses is poisonous, being the only sodium salt (besides the arseniate) that is so. The incompatibles should be remembered. Nitrite of Sodium is a powerful remedy, and its use requires caution.

Dose.—5 grains.

Incompatibles.—Acids.

Sodii Sulphas—Sulphate of Sodium, 'Glauber's Salt'; $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$.

Production.—By neutralizing Acid Sulphate of Sodium (a by-product) with Carbonate of Sodium, and crystallizing.

Characters.—Colourless transparent crystals, or masses of crystals. Effloresces on exposure to the air. Soluble in water (1 in 3). Insoluble in spirit.

Prescribing.—Sulphate of Soda is prescribed in solution. It is usual to combine it with a carminative. Liquorice covers the bitter taste.

Dose.—1 oz.

Preparation.—**Sodii Sulphas Effervescens**—Effervescing Sulphate of Sodium (Sulphate of Sodium, Bicarbonate of Sodium, Citric and Tartaric Acids—1 in 2); Granular. *Dose*.— $\frac{1}{2}$ oz.

Soda Caustica—Caustic Soda, Hydrate of Sodium; NaHO .

Production.—By boiling a mixture of Carbonate

of Sodium, slaked Lime, and Water, filtering, evaporating, and fusing.

Characters.—In hard grayish-white, opaque lumps or sticks. Slightly deliquescent. Very corrosive and alkaline. Freely soluble in water.

Prescribing.—Not often given internally, when so, in solution; the official liquor. Externally it is sometimes used as a Caustic. (See Caustic Potash.)

Incompatibles.—See Caustic Potash.

Liquor Sodæ—Solution of Soda, solution of Caustic Soda.

Production.—By boiling together a mixture of Carbonate of Sodium and slaked Lime, and filtering.

Characters.—A colourless, strongly-alkaline liquid, communicating a soapy feel to the fingers (18·8 grains Caustic Soda in 1 oz.).

Prescribing.—Not often used internally. (See Caustic Potash.)

Dose.—1 dram.

Incompatibles.—As Caustic Potash.

***32. Sulphur Sublimatum**—Sulphur, 'Flowers of Sulphur,' 'Brimstone,' Roll Sulphur; S_2 .

Production.—Elementary substance occurring native, and purified by sublimation.

Characters.—Greenish-yellow gritty powder, no taste or smell, unless heated. Inflammable. Insoluble in water. Soluble by heat in fixed oils, Carbon Disulphide, and Turpentine.

Recognition.—Sulphur is recognised by its colour and general appearance. It is sometimes seen in solid rolls or masses which are crystalline. The Sublimed Sulphur must be carefully distinguished from the Precipitated Sulphur. The latter is nearly white in colour, and free from grittiness. The two substances are chemically identical, but differ slightly in properties.

Prescribing.—Sulphur may be prescribed internally in powder or in mixture, suspended with acacia. It is also taken mixed with syrup or honey. 'Brimstone and Treacle' is a common domestic medicine. Externally Sulphur is used in lotions, rubbed down with Glycerine and Water, in ointments, and in its dry state. The yellow Sulphur is to be preferred for medicinal purposes.

Dose.—60 grains.

Incompatibles.—Chlorate of Potas. in powder.

Preparations.—*Confectio Sulphuris*—Confection of Sulphur (Sulphur, Acid Tartrate of Potas., Tragacanth and Syrup of Orange-peel—2 in 5). *Dose.*—2 drams.

Pulvis Glycyrrhizæ Compositus—(1 in 12). (See Senna.)

Trochisci Sulphuris—Sulphur Lozenges (Sulphur 5 grains, Acid Tartrate of Potassium 1 grain, Sugar and Tincture of Orange-peel in each Lozenge). *Dose.*—6.

Unguentum Sulphuris—Sulphur Ointment (Sulphur, Benzoated Lard—1 in 5).

*33. **Sulphur. Præcipitatum**—Precipitated Sulphur, 'Milk of Sulphur'; S_2 .

Production.—By boiling together Sulphur, slaked Lime, and Water, filtering, treating the filtrate with Hydrochloric Acid, and collecting the precipitate.

Characters.—A soft grayish-yellow powder, free from grittiness. Has no taste or smell. Insoluble in water. Soluble by heat in fixed oils and turpentine. Soluble in Disulphide of Carbon.

Recognition.—Precipitated Sulphur may be recognised by its peculiar pale, grayish-yellow colour, soft feel, and light weight. The student must distinguish it from Sublimed Sulphur (q.v.)

Prescribing.—As Sublimed Sulphur. The yellow Sulphur is more largely used

Dose.—60 grains.

Incompatibles.—As Yellow Sulphur.

Calx Sulphurata—Sulphurated Lime, Sulphide of Calcium; CaS (50 per cent.).

Production.—By heating Sulphate of Calcium with powdered wood charcoal.

Characters.—A dirty-white powder, smelling of Sulphuretted Hydrogen. Insoluble in water.

Prescribing.—Calcium Sulphide is prescribed in pills, which should be varnished, not silvered.

Dose.—1 grain.

Potassa Sulphura—Sulphurated Potash, 'Hepar Sulphuris,' Liver of Sulphur, Potassii Sulphuretum; K_2S (impure).

Production.—By fusing Carbonate of Potassium and Sulphur together.

Characters.—Solid greenish fragments. Liver-brown when freshly broken. Alkaline, and generally smells strongly of Sulphuretted Hydrogen. Soluble in water, forming a yellow solution. Partially soluble in spirit.

Prescribing.—Not used internally. Externally in ointments and lotions.

Preparation.—*Unguentum Potassæ Sulphuratæ* (Sulphurated Potash, hard and soft Paraffin, 30 grs. in 1 oz.)

Incompatibles.—Acids, Metallic Salts.

Zinci Chloridum—Chloride of Zinc; ZnCl_2 .

Production.—By dissolving metallic Zinc in dilute Hydrochloric Acid, removing any Iron or Lead present by Chlorine, filtering, evaporating, and fusing.

Characters.—White opaque rods or masses. Very deliquescent. Caustic. Soluble in water (5 in 2). Soluble in ether and in spirit.

Prescribing.—Chloride of Zinc is not used internally. It is largely used as a caustic in sticks, and

as lotions and injections dissolved in water. Chloride of Zinc is disinfectant, and its solution forms 'Burnett's Disinfecting Fluid.' It is very deliquescent, and must not be exposed to air more than is necessary.

Incompatibles.—Nitrate of Silver.

Preparation.—*Liquor Zinci Chloridi*—Solution of Chloride of Zinc (the same process as for making Chloride of Zinc, the solution being evaporated to a definite bulk—366 grains in 1 oz.).

Zinci Oxidum—Oxide of Zinc, 'Zinc White'; ZnO .

Production.—By calcining Carbonate of Zinc, or by burning metallic Zinc in air.

Characters.—A pure white or slightly yellow powder. Tasteless and inodorous. Insoluble in water.

Prescribing.—*Zinci Oxidum* may be prescribed internally in pill or powder; the latter is a common form, as the powder is tasteless. Oxide of zinc is largely used externally in the form of powder mixed with starch or in lotions with Glycerine and Water, or in ointments.

Dose.—10 grains.

Preparations.—*Unguentum Zinci*—Zinc Ointment (80 grains of Oxide of Zinc in 1 oz. Benzoated Lard).

Oleatum Zinci (1 part Zinc Oxide heated with 9 Oleic Acid); semi-solid oily substance, smells of Oleic Acid.

Unguentum Zinci Oleati (1 Zinc Oleate, 1 soft Paraffin).

*34. *Zinci Sulphas*—Sulphate of Zinc, 'White Vitriol'; $ZnSO_4 \cdot 7H_2O$.

Production.—By dissolving Zinc in dilute Sulphuric Acid, removing lead and iron if necessary with Chlorine, filtering, evaporating, and crystallizing.

Characters. — Colourless transparent needles. Taste astringent and metallic. Soluble in water (10 in 7). Insoluble in Spirit.

Recognition. — The shape of the crystals, absence of smell, and general appearance distinguish Sulphate of Zinc. The crystals much resemble those of Sulphate of Magnesium. For distinction between the two salts, see Sulphate of Magnesium.

Prescribing. — Sulphate of Zinc is used internally in solution or pills. Externally it is largely used in lotions and injections.

Dose. — 3 grains as a tonic ; 30 grains as an emetic.

Incompatibles. — Alkalies and Alkaline Carbonates, Liquor Bismuthi.

PART II.

ORGANIC AND VEGETABLE SUBSTANCES.

The drugs in this part are grouped according to the arrangement of the examination schedule. Drugs which resemble each other in medicinal properties are thus placed together. This arrangement, by accustoming students to associate certain drugs with each other, is useful in the study of therapeutics.

Section A.—Organic Substances.

Group I.—Alcohol and Substances prepared therefrom.

Alcohol Ethylicum—Ethylic Alcohol, Alcohol, Absolute Alcohol, Ethyl Hydrate; $C_2H_5(OH)$ (99 per cent.).

Production.—The Ethylic Alcohol of the B.P. is made from Rectified Spirit, by removing the water present with dried Carbonate of Potassium and Chloride of Calcium, and distilling.

Characters.—A colourless liquid, with an agreeable ethereal odour. Inflammable. Miscible in all proportions with water. A powerful solvent for most fats, oils and resins. Should not contain more than 1 per cent. of water.

Prescribing.—Ethylic Acid is not used in its pure state. It acts very powerfully undiluted. It is

largely ordered in the form of Brandy, etc. A useful mode of prescribing it is in the form of *Mistura Spiriti Vini Gallici* (B.P.). For further uses, see Rectified Spirit. The proportion of Absolute Alcohol (by weight) in the most commonly used alcoholic liquors is: Brandy, Rum, Gin, and Whisky, 40 to 56 per cent.; Port and Sherry, 14 to 18 per cent.; Claret and Hock, 8 to 11 per cent. Beers vary largely, according to age and other circumstances, generally between 3 to 6 per cent. *Vinum Xericum* of the B.P. contains 17 per cent.; *Vinum Aurantii*, 10 to 12 per cent.

***35. Spiritus Rectificatus**—Rectified Spirit, Spirit of Wine, S.V.R.; C_2H_5OH (84 per cent).

Production.—Alcohol is obtained by the fermentation of various grains containing sugar, and separation of the Alcohol by distillation. It is very largely prepared by fermenting solutions of sugar with yeast.

Characters.—A colourless, transparent liquid; volatile; inflammable. Smell pleasant and penetrating; taste burning. Rectified Spirit should leave no unpleasant smelling substance when evaporated.

Recognition.—The colourless, transparent nature and characteristic smell distinguish Rectified Spirit. Students must carefully notice the smell, and not confound it with that of other spirituous bodies.

Prescribing.—Rectified Spirit, in its pure state, is not often used internally, but it may be well to remember that, diluted with an equal volume of water, it may serve as a ready substitute for brandy. Externally, spirit is antiseptic and disinfectant. It is used to harden the skin, by rubbing; in liniments, as a counter-irritant; and in lotions, with water, for a cooling application.

'Methylated Spirit' consists of Rectified Spirit,

to which 10 per cent. of Wood Naphtha and a small quantity of Mineral Naphtha have been added. It is cheap, and may be used as a substitute for Rectified Spirit in certain liniments and as a preservative for specimens, etc.

Preparation.—Rectified Spirit, either pure or diluted with water, in the form of Proof Spirit, is used in the manufacture of all the tinctures, essences, and spirits. It is also used in most of the liniments, and in the liquors.

Spiritus Tenuior—Proof Spirit—S.V.T. ; C_2H_5OH (49 per cent.).

Production.—By mixing 5 volumes of Rectified Spirit with 3 of distilled water. A certain amount of heat is developed, and contraction takes place, so that the final measure is not exactly 8 volumes. Proof Spirit contains 49 per cent. by weight, and 57 per cent. by volume, of Absolute Alcohol.

Characters.—A colourless liquid with a spirituous odour. Inflammable. Proof Spirit is taken as a standard by the Excise for the strength of alcoholic liquids ; thus 45 per cent. 'Over Proof' (45 per cent. O.P.) means that 100 volumes of such liquid contains as much alcohol as 145 volumes of Proof Spirit ; so 45 per cent. 'Under Proof' contains as much alcohol as a mixture of 55 parts of Proof Spirit with sufficient water to make 100 parts.

Preparations.—Proof Spirit is used in making many tinctures of the 'Pharmacopœia.' (See Tinctures.)

Incompatibles.—Spirit is incompatible with all inorganic sulphates, unless sufficient water is present to dissolve them. Mucilages are precipitated by alcohol.

*36. **Æther**—Ether, Sulphuric Ether, Ethyl Oxide ; $(C_2H_5)_2O$ (92 per cent.).

Production.—By distilling Sulphuric Acid with

Rectified Spirit, and freeing the distillate from water and acid by Slaked Lime and Chloride of Calcium.

Characters.—A very light, mobile, colourless, and very volatile liquid. Very inflammable. Odour penetrating and peculiar. Slightly soluble in water.

Recognition.—Note the light weight, mobile and volatile nature, and especially the extremely characteristic smell. The student should compare this body with Chloroform.

Prescribing.—Ether is largely used internally, pure or mixed with spirit (Sp. *Æther*), both diluted with water before administering. Ether is also largely used by inhalation to produce insensibility. For this purpose the Ether (unlike Chloroform) is given mixed with but little air (30 per cent.). The dose varies considerably with circumstances (4 drams to several ounces). Ether is also largely used externally in the form of spray, or on lint to produce local insensibility.

Dose.—60 minims.

Preparations.—*Æther Purus*—Pure Ether. This is ordinary Ether which has been freed from Alcohol and Water by Lime and Chloride of Calcium. It is identical with Ether, but has a lower specific gravity. Ordinary Ether has a specific gravity of $\cdot 735$, *Æther Purus* of $\cdot 720$. Ether of the latter specific gravity is to be used for producing anæsthesia.

Spiritus Ætheris—Spirit of Ether (Ether 1, Rectified Spirit 2). *Dose.*—90 minims.

Spiritus Ætheris Compositus—Compound Spirit of Ether, 'Hoffman's Anodyne.' Made by mixing Sulphuric Acid with Rectified Spirit, allowing the mixture to stand for 24 hours, and distilling. The distillate is purified by Lime-water and exposure. Three drams of the distillate are mixed with 8 oz. of Ether and 16 oz. of Spirit. Hoffman's Anodyne

contains Sulphate of Ethyl, $(C_2H_5)_2SO_4$, dissolved Ethylene, C_2H_4 , Ether, and other bodies. *Dose*.—2 drams.

Ether is also used in making Collodium, and Tr. Chlorof. et Morph., B.P.

***37. Chloroformum** — Chloroform, Methenyl Chloride, Trichloromethane; $CHCl_3$.

Production.—By distilling a mixture of Slaked Lime, Chlorinated Lime, and Rectified Spirit. The distillate is treated with water, Sulphuric Acid, Alkaline Water, Lime, and Chloride of Calcium successively, redistilled, and to this distillate 1 per cent. of Ethylic Alcohol added.

Characters.—A heavy, colourless liquid. Volatile. Not inflammable. Odour sweet and penetrating. Taste sweet and burning. Miscible with Alcohol and Ether in all proportions; with water (1 in 200); with spirit (10 in 7); also freely with most fixed oils and turpentine.

Recognition.—Chloroform is at once recognised by its weight, volatile nature, and especially extremely characteristic smell. The student should compare its properties with Ether.

Prescribing.—Chloroform is very largely used internally in solution as a flavouring and carminative agent. It is largely given in the form of vapour by inhalation, to produce insensibility; for this purpose the vapour is administered largely diluted with air. Externally, Chloroform is used to produce local insensibility, and in lotions and liniments as a counter-irritant.

Dose.—10 minims.

Incompatibles.—Chloroform must not be kept exposed to much sunlight, and should be kept in a cool place.

Preparations.—*Aqua Chloroformi* — Chloroform Water (Chloroform 1 in Water 200). *Dose*.—2 oz.

Linimentum Chloroformi—Chloroform Liniment (Chloroform, Camphorated Oil—equal parts). The Camphorated Oil prevents too rapid evaporation of the Chloroform.

Spiritus Chloroformi—Spirit of Chloroform, 'Chloric Ether' (Chloroform 1, Rectified Spirit 19—1 in 20). *Dose*.—60 minims.

Tinctura Chloroformi Composita—Compound Tincture of Chloroform (Chloroform, Rectified Spirit, Tincture of Cardamoms—1 in 10). *Dose*.—60 minims.

Tinctura Chloroformi et Morphinæ—Tincture of Chloroform and Morphia, 'Chlorodyne' (Chloroform, Ether, S.V.R., Morphine, Prussic Acid, Oil of Peppermint, Extract of Liquorice, Syrup, and Treacle). 10 minims contain Chloroform, $1\frac{1}{4}$ minims; Prussic Acid, $\frac{5}{8}$ minim; Morphine, $\frac{1}{48}$ grain. *Dose*.—10 minims.

*38. **Iodoformum**—Iodoform, Tri-iodomethane; CHI_3 .

Production.—By boiling a mixture of Alcohol, Water, Carbonate of Potassium, and Iodine together. The Iodoform separates, and is filtered off.

Characters.—Shining, bright-yellow scales or powder. Odour most peculiar and persistent. The powder has a greasy feel. Taste sweetish. Slightly soluble in spirit and in water; soluble in Chloroform, Ether, Fixed Oils and Fats, and Volatile Oils.

Recognition.—The remarkable and persistent smell of Iodoform and its yellow colour at once identify it.

Prescribing.—Iodoform is seldom used internally (in pill); externally it is a valuable antiseptic, and is very largely used in the form of dry powder, or a mixture of powder and crystals, and in ointments, suppositories, and bougies. Iodoform wool, and lint are also much employed. Several substances

have been used to disguise the smell of Iodoform, but with little success. Cumarin and powdered Coffee are the most efficient.

Dose.—3 grains.

Preparations.—*Suppositoria Iodoformi*—Iodoform Suppositories (Iodoform, Oil of Theobroma—3 grs. in each).

Unguentum Iodoformi (Iodoform, Benzoated Lard—1 to 9).

Group II.—Hypnotics, etc.

*39. **Chloral Hydras**—Hydrate of Chloral, Chloral, Trichloraldehyde, Hydrous Chloral; C_2HCl_3O, H_2O .

Production.—By the continued action of dry Chlorine on Alcohol, purification of the Chloral formed, and conversion into hydrate by water.

Characters.—Colourless crystals, or white crystalline masses. Not deliquescent. Odour pungent and peculiar. Caustic to the skin. Freely soluble in water (1 in less than 1); soluble in Rectified Spirit, Ether, and Chloroform. Becomes liquid when rubbed with Camphor. Heated with an alkali yields Chloroform.

Recognition.—The shape and appearance of the crystals, and the peculiar characteristic smell, distinguish Chloral Hydrate. Butyl Chloral Hydrate, which has much the same smell, is in very small crystals, and not so soluble in water.

Prescribing.—Chloral Hydrate is sometimes used externally in the form of weak solution. Strong solutions are powerfully caustic. The mixture with Camphor (equal parts) is much used externally.

Internally, Chloral Hydrate is much given in solution and in the form of syrup.

Dose.—30 grains (usual dose 10).

Incompatibles.—Alkalies, Antipyrin.

Preparations.—*Syrupus Chloral*—Syrup of Chloral (Chloral Hydrate, Water, Syrup—10 grains in 1 dram). *Dose.*—2 drams.

*40. **Paraldehydum**—Paraldehyde; $C_6H_{12}O_3$.

Production.—A polymer of Aldehyde, prepared by treating Aldehyde with gaseous Hydrochloric Acid or other reagents. It consists of 3 molecules of Aldehyde condensed to $1 = 3(C_2H_4O)$.

Characters.—A colourless liquid, with an ethereal, unpleasant smell. Taste nauseous and burning. Miscible with water (1 in 10), and in all proportions with Ether and Rectified Spirit.

Recognition.—The smell is the most distinctive feature. It is extremely disagreeable and penetrating, and does not resemble that of any other drug. The colourless nature of the liquid should also be noticed.

Prescribing.—Paraldehyde is prescribed in solution with water. The taste is unpleasant, and syrup and a flavouring agent should be ordered to disguise it. In ordering Paraldehyde, be careful to order sufficient water to dissolve it.

Dose.—90 minims.

Butyl Chloral Hydras—Croton Chloral Hydrate, Croton Chloral, Hydrous Butyl Chloral, Trichlorobutylidene Glycol; $C_4H_5Cl_3O, H_2O$.

Production.—By the continued action of dry Chlorine Gas on Aldehyde, the Butyl Aldehyde separated by distillation, and converted into the solid hydrous salt by water.

Characters.—White pearly, crystalline scales. Odour much like that of Chloral Hydrate, but fainter. Soluble in Water (1 in 50), in Glycerine (1 in 1), in Spirit (1 in 1); nearly insoluble in Chloroform. Does not yield Chloroform with an alkali.

Prescribing.—Butyl Chloral Hydrate is not used externally. Internally it may be given in powders with sugar, or suspended in water, or in small doses in solution.

Dose.—15 grains.

Incompatibles.—Antipyrin.

Sulphonal—Sulphonal, Diethylsulphon-dimethylmethane ; $(\text{CH}_3)_2\text{C}(\text{SO}_2\text{C}_2\text{H}_5)_2$.

Production.—By the interaction of Mercaptan and Acetone in the presence of HCl and oxidation of the ' Mercaptol ' formed.

Characters.—Small white crystals and powder. Inodorous and nearly tasteless. Almost insoluble in Water (1 in 450); soluble in Rectified Spirit (1 in 50) and in Ether.

Prescribing.—Sulphonal is best given in powder. It should be reduced to the finest possible powder and given alone, followed by water, or in wafer paper. It takes some time to act, and should be ordered 4 or 6 hours before the effect is required. Sulphonal in small doses may be given in solution in a little spirit and water.

Dose.—40 grains.

Group III.—Substances acting on the Circulation, etc.

Amyl Nitris — Nitrite of Amyl ; $\text{C}_5\text{H}_{11}\text{NO}_2$. Impure.

Production.—By the action of Nitric or Nitrous Acid on Amylic Alcohol, and distillation.

Characters.—A yellow ethereal liquid with a very penetrating and peculiar odour, suggestive of pineapple. Freely soluble in Rectified Spirit, Ether, and Chloroform. Almost insoluble in water.

Prescribing.—Amyl Nitrite is rarely used internally by the mouth. It is usually given by inha-

lation. A dose is placed on a handkerchief and inhaled, or it may be kept in small glass capsules, each containing a dose, which are to be broken before use, and the vapour inhaled.

Dose.—By inhalation, 5 minims; by the mouth, 1 minim.

Care must be used in the inhalation, as it acts very powerfully on some systems.

Note that Sodium Nitrite has an analogous action.

Nitroglycerinum—Nitroglycerine, Glonoin, Trinitrin, Glyceryl Trinitrate; $C_3H_5(NO_3)_3$.

Production.—By dropping Glycerine into a mixture of Sulphuric and Nitric Acids, pouring into water, and washing the oily liquid, which separates with ice-cold water.

Characters.—Oily, colourless, odourless, sweet liquid. Freely soluble in alcohol, ether, oils, and fats. Almost insoluble in water. Very explosive and dangerous to handle.

Prescribing.—Nitroglycerine is never used in its undiluted state. It is given internally in alcoholic solution and in the *Tabellæ*, the Nitroglycerine being first dissolved in Oil of Theobroma.

Dose.— $\frac{1}{50}$ grain.

Preparations. — *Liquor Trinitrini*—Solution of Trinitrin (1 Nitroglycerine in 100 Rectified Spirit).

Dose.—2 minims. A colourless liquid. Perfectly safe to handle.

Tabellæ Nitroglycerini—Nitroglycerine Tablets. Nitroglycerine dissolved in Oil of Theobroma, and Chocolate added to make a tablet. Each tablet weighs $2\frac{1}{2}$ grains, and contains $\frac{1}{100}$ grain Nitroglycerine. *Dose.*—2 (quickly eaten).

*41. **Spiritus Etheris Nitrosi**—Spirit of Nitrous Ether, 'Sweet Spirits of Nitre'; $C_2H_5NO_2$ (with many other bodies).

Production.—By distilling a mixture of Sulphuric and Nitric Acids, Copper, and Rectified Spirit.

Characters.—A colourless or slightly yellow liquid. Transparent. Odour penetrating and peculiar, suggestive of apples. Miscible with water. Spirit of Nitrous Ether is a very complex body, containing Ethyl Nitrite, Aldehyde, free Acids, etc. It is nearly always acid, but may be kept neutral by keeping a few crystals of Potassium Bicarbonate in the liquid.

Recognition.—The slightly yellow colour and peculiar odour are characteristic of Spirit of Nitrous Ether.

Prescribing.—Spirit of Nitrous Ether is prescribed in mixture. Small doses may be taken dropped on sugar.

Dose.—2 drams.

Incompatibles.—These apply mostly to Acid Spirit of Nitrous Ether, but even neutral spirit should not be prescribed with the following: Antipyrin, Gallic and Tannic Acids, Iodide of Potassium and other soluble Iodides, Sulphate of Iron, Tincture of Guaiacum, Emulsions.

Group IV.—Organic Antipyretics (Artificial Alkaloids).

Acetanilidum—Acetanilide, 'Antifebrin,' Phenyl-acetanide; $C_6H_5NHC_2H_3O$.

Production.—By the action of strong Acetic Acid on Aniline, and purification.

Characters.—White, glistening, scaly crystals, without smell. Reaction neutral. Taste pungent. Soluble in water (1 in 200). Freely soluble in chloroform, ether, and rectified spirit.

Prescribing.—Antifebrin may be ordered in powder as Sulphonal, but it is best given in diluted spirit (wine or brandy and water). Not used externally.

Dose.—10 grains.

Phenacetinum—Phenacetin, Para - acet - phenetidid ; $C_{10}H_{13}NO_2$.

Production.—By the action of strong Acetic Acid on Para-Phenetidin derived from Phenol.

Characters.—White, shining, scaly crystals. No taste or smell. Almost insoluble in water. Soluble in rectified spirit (1 in 16).

Prescribing.—Phenacetin is best ordered in powder as Sulphonal. It may be given also in diluted spirit or wine as Antifebrin.

Dose.—10 grains.

Phenazonum—Phenazone, ' Antipyrin,' Phenyl-dimethyl-pyrazolone ; $C_6H_5(CH_3)_2C_3HN_2O$.

Production.—Obtained by a series of processes from Phenylhydrazine. Pyrazol is first formed, and this is treated with Methyl Iodide.

Characters.—White scaly crystals. No smell, and with a very slight bitter taste. Freely soluble in water (1 in 1), chloroform, and rectified spirit.

Prescribing.—Antipyrin may be prescribed in powders, to be dissolved in water, or in solution.

Dose.—20 grains.

Incompatibles.—Acids : Carbolic, Hydrocyanic, Nitric, and Tannic ; Alum, Arsen. Iodid., Chloral Hydras, Butyl Chloral Hydras, Cupri Sulphas, Decoct. Cinchonæ, and astringent infusions generally ; Ferri Sulph., Hydrarg. Perchlor., Iron preparations, Iodine, Spiritus Etheris Nitrosi, Salicylate of Sodium (in powder), Amyl Nitrite.

Group V.—Collodion.**Collodium—Collodion.**

Production.—By dissolving Pyroxylin (gun-cotton) in a mixture of Ether and Rectified Spirit (1 Pyroxylin, 36 Ether, 12 S.V.R.).

Characters.—A syrupy liquid, colourless or slightly yellow, with a strong smell of Ether. A drop evaporated leaves a thin, transparent, tough film, insoluble in water and spirit.

Prescribing.—Collodium is used to form an artificial skin on the surface of cuts, wounds, etc. It is a useful adjunct in the post-mortem room.

Preparation.—Collodium Flexile—Flexible Collodium (Collodion, Canada Balsam, Castor Oil).

This liquid on evaporation leaves a film which does not contract on drying, and which is tougher and less soluble than the film of ordinary Collodion. Flexible Collodion is to be preferred to common Collodion.

Group VI.—Carbolic Acid.

*42. **Acidum Carbolicum**—Carbolic Acid, Phenol, Phenic Alcohol, Phenic Acid, Phenyl Alcohol; C_6H_5OH .

Production.—Obtained from Coal-tar by fractional distillation.

Characters.—Carbolic Acid occurs in two forms, a mass of acicular crystals or separate pulverulent crystals. The two forms are identical in composition, but the pulverulent is slightly less soluble in water. The latter form is the most convenient for dispensing. Carbolic Acid in crystals is colourless or with a reddish or brownish tinge. The odour is tarry and peculiar. Soluble in water (1 in 18 or 1 in 12), miscible with water (10 to 3 or 4) on the addition of 5 parts of water to 100 parts of acicular

variety, or 10 parts to 100 parts pulverulent; the acids remain permanently liquid. Carbolic Acid is freely soluble in spirit, ether, volatile oils, glycerine, olive oil (1 in $1\frac{3}{4}$), chloroform, and ether. It is a powerful caustic, turning the skin white.

Recognition.—The peculiar odour and white or reddish colour at once distinguish Carbolic Acid.

Prescribing.—Carbolic Acid may be prescribed in pills made with a little inert vegetable powder, or in solution. It is very largely used externally as an antiseptic and disinfectant, in solution, ointments, oils, and on gauze and lint. Carbolic Acid mixed with glycerine, or in its pure liquid state, is sometimes used as a caustic.

Dose.—3 grains.

Incompatibles.—Antipyrin, Iron Salts, Ammonia.

Preparations.—All made with Crystalline Acid.

Acidum Carbolicum Liquefactum—Liquid Carbolic Acid.

Production.—By adding 10 per cent. of distilled water to Carbolic Acid.

Characters.—A colourless, or reddish, or brown liquid, having the odour and taste of Carbolic Acid. Powerfully caustic. Liquid Carbolic Acids for disinfecting, of all colours, from black to straw colour, are largely used; they are highly impure, and are not to be used in medicine.

Prescribing.—In solution.

Dose.—4 minims.

Preparations.—*Glycerinum Acidi Carbolicici*—Glycerine and Carbolic Acid (Carbolic Acid 1, Glycerine 4—1 in 5).

Suppositoria Acidi Carbolicici cum Sapone—Carbolic Acid Suppositories (Carbolic Acid, Curd Soap, Glycerine of Starch—1 gr. in each).

Unguentum Acidi Carbolicici—Carbolic Ointment (Carbolic Acid, Hard and Soft Paraffin—1 in 19).

Group VII.—Salicylic Acid.

*43. **Acidum Salicylicum**—Salicylic Acid, Hydroxybenzoic Acid ; $\text{HC}_7\text{H}_5\text{O}_3$.

Production.—By combining the elements of Carbolic Acid with those of Carbonic Acid Gas, and purifying ; or it is obtained from natural Salicylates (of Methyl) present in the oils of Sweet Birch and Wintergreen.

There are thus two Salicylic Acids : 'natural,' from the natural salicylates ; and 'artificial,' from Carbolic Acid. There has been much discussion as to the relative value of these two forms, but it may now be regarded as settled that, when pure, they are identical in chemical structure and in physiological action.

Characters.—Salicylic Acid occurs in very small white acicular crystals, somewhat resembling Quinine Sulphate, but with a harsh crystalline feel, or in larger separate crystals, somewhat resembling in size and shape Strychnine. Salicylic Acid has no smell, but the powder and fine crystals are very irritating to the nostrils. Taste acid and sweetish. Sparingly soluble in water (1 in 700) ; soluble freely in alcohol and ether. Soluble also in solutions of Acetate and Citrate of Ammonium, Borax and Phosphate of Sodium.

Recognition.—Compare this substance with Sulphate of Quinine and Strychnine and Benzoic Acid. These are the only three substances to be recognised that at all resemble it. Notice the size of the crystals and their harsh feel. Quinine is smaller and soft, and not irritating to the nostrils. If the Salicylic Acid is in large crystals, note that the colour and general appearance are different from Strychnine crystals. Benzoic Acid has an odour, Salicylic Acid none.

Prescribing.—Salicylic Acid is seldom used internally in its free state; the Sodium Salt being usually employed—it can be ordered in powders. Externally it is much used in powder, with chalk or starch, and in ointment and plaster. Dissolved in collodion it is a popular remedy for corns; in solution with Acetate of Ammonium it is used as a paint or lotion.

Dose.—30 grains.

Incompatibles.—Iron salts.

Preparation.—*Unguentum Acidi Salicylici*—Ointment of Salicylic Acid (Salicylic Acid, Hard and Soft Paraffin—1 in 28).

Sodii Salicylas.—Salicylate of Sodium; ($\text{NaC}_7\text{H}_5\text{O}_3$).

Production.—By neutralizing Salicylic Acid with Caustic Soda or Carbonate of Sodium. As there are two acids, there are two Sodium Salts, 'natural' and 'artificial.' (See Salicylic Acid.)

Characters.—Small white or nearly white crystalline scales, or in powder, or in small crystalline masses; should have no smell; taste sweet and peculiar; soluble freely in water and spirit; powder irritating to the nose.

Prescribing.—Salicylate of Sodium may be ordered in powders, to be dissolved in water or in solution—the latter is most common; not used externally.

Dose.—30 grains.

Incompatibles.—Acids, Iron Salts, Antipyrin (in powder).

Section B.—Vegetable Substances.

Definitions.—Besides the Roots, Barks, Leaves, Fruits, Flowers, etc., which are used in medicine, there are certain substances which are derived from plants which call for a general description.

Alkaloids.—These are substances which are found ready formed in plants, and are isolated by various processes. An alkaloid is generally the most important constituent in the plant from which it is derived, and usually represents the active principle upon which the value of the plant as a medicine depends. Chemically, alkaloids may be regarded as compound ammonias, and so always contain nitrogen; they have also usually a strong alkaline reaction, and easily form salts with acids. They are generally more or less crystalline solids, soluble in alcohol, and with a bitter taste. Some alkaloids, whose chemical structure is known, have been made artificially.

Organic Acids.—The alkaloids rarely occur in the drug in an uncombined state; they are generally present in the form of a salt, with an organic acid, such as Tannic, Malic, etc. Thus, Morphine occurs in Opium as Meconate of Morphine. These alkaloidal salts may be soluble in water. Organic acids also occur combined with Calcium, Potassium, etc., and in the free state.

Glucosides.—These are bodies somewhat resembling, in properties, the alkaloids; but they are not necessarily nitrogenous, and unlike the alkaloids, when treated with dilute acids and other reagents, decompose and yield glucose (grape-sugar) and some other substance. Thus Salicin boiled with dilute Sulphuric Acid yields Glucose and Saligenin.

Gums.—These are dried exudations from the stems of plants. They are usually entirely or partially soluble in water. They are of complex constitution, and generally contain one or both of two carbohydrates: *Bassorin*, insoluble in water; and *Arabin*, soluble in water. Solutions or mixtures of gums with water are known as 'Mucilages.'



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Bitter Principles.—This name is applied to certain substances which, being neither glucosides nor alkaloids, yet have a bitter taste and form the active principle of many drugs. Quassin, the active principle of Quassia-wood, is an example.

Fixed Oils.—These substances are solid, semi-solid, or liquid. They are obtained from parts of plants (usually seeds or fruits) by pressure, 'expression,' or by heat and pressure. Oils expressed without heat are called 'cold-drawn.' Fixed oils, or fats, are also found in animal tissues, *e.g.*, lard. Chemically, fixed oils consist of the radical glyceryl, C_3H_5 , in combination with Oleic, Palmitic, Stearic, and other members of the fatty acid series. When fixed oils are treated with alkalies they form soaps, and glycerine is set free; this process is called 'Saponification.' Fixed oils have little or no smell. Fixed oils are immiscible with water, except in the form of 'Emulsions' (q.v.), and they cannot be distilled without decomposition.

NOTE.—The student must carefully distinguish vegetable fats and oils from mineral fats and oils, such as 'Vaseline,' Paraffin Molle, and 'Mineral oil.' These latter are not compounds of fatty acids, but contain simply Carbon and Hydrogen in varying proportions; they cannot be saponified, do not yield glycerine, or become rancid from decomposition, and can, at high temperatures, be distilled unchanged.

Volatile Oils.—These substances, which may be liquid or solid, are contained in many vegetable drugs, and generally constitute the odoriferous and aromatic part of the drug. Their constitution is very complex, but most of them contain the hydrocarbon terpene, $C_{10}H_{16}$, or some isomeric modification of it. They in no way resemble chemically fixed oils, do not saponify, and can be distilled or

sublimed unchanged. The solid oils, which usually contain Oxygen, are called 'Stearoptenes,' the liquid, 'Elæoptenes.' Volatile oils, shaken in small quantities with water, dissolve and flavour the water.

The student should carefully notice the difference, chemical and physical, between fixed and volatile oils.

Resins.—These are substances which are generally regarded as volatile oils which have become oxidized. They are solid, non-volatile, brittle substances, insoluble in water. Most of them form soluble compounds with alkalies, and may be emulsified like fixed oils.

Gum Resins.—These are mixtures of gum and resin, and generally a little volatile oil. They can be usually at once made into an emulsion by rubbing down in a mortar with a little water, the gum suspending the resin.

Oleo Resins.—These are solutions of resin in volatile oil. Crude turpentine, as it exudes from the tree, is an example. On distilling an oleo resin, the volatile oil distils off and the resin is left behind. Oleo resins may be emulsified in the same way as fixed oils.

Balsams.—Balsams are oleo resins which contain either Cinnamic or Benzoic Acids. They are aromatic, and generally more complex in constitution than ordinary oleo resins. Balsams may be emulsified in the same way as fixed oils.

Group I.—Aconite.

*44. **Aconiti Radix**—Aconite Root, 'Monkshood' Root.

Production.—The dried Root of *Aconitum Napellus*.

Characters.—Dark-brown, tapering roots, 2 or 3 inches long. The thicker end is usually crowned with the remains of the stem. Whitish within. Has no smell, and when chewed excites a sensation of tingling and numbness.

Recognition.—Note that the drug is in single roots, which are tapering, and have usually a ring at the upper end formed of the remnant of the stem; that the root is black, or dark-brown, and has no smell. Compare the root with a narrow piece of jalap, and notice that jalap has no crown, and differs much in general appearance. These characters will easily distinguish Aconite.

Composition.—Aconite contains a very powerful poisonous alkaloid, Aconitine, .03 per cent.; Aconitic Acid, Napelline—a less powerful alkaloid—Resin, and fatty matter.

Prescribing.—Preparations of Aconite Root are used both externally and internally, in the form of Liniment and Tincture. Internally Aconite is best given in small and repeated doses. For external use the Liniment is painted on the skin. It is very poisonous.

Preparations.—*Linimentum Aconiti*—Liniment of Aconite (Aconite Root 1, S.V. Rect. $1\frac{1}{2}$, with Camphor. By maceration and percolation).

Tinctura Aconiti—Tincture of Aconite (Aconite Root $2\frac{1}{2}$ oz., S.V.R. 1 pint. Maceration and percolation). *Dose.*—15 minims.

Aconitina—Aconitine, Aconitia (an alkaloid from Aconite Root).

Production.—By exhausting Aconite Root with spirit (boiling and maceration), distilling and evaporating, dissolving the residue in water, precipitating the alkaloid by Ammonia, and purifying by redissolving in Ether and Sulphuric Acid, and reprecipitation by Ammonia.

Characters.—A white amorphous solid, soluble in water (1 in 150), and freely in Alcohol, Ether, and Chloroform. The B.P. Aconitine is a very unreliable and impure substance. Pure crystalline Aconite can be obtained, and should alone be used in medicine; this is hardly soluble in water (1 in 4,000), freely in Alcohol, Ether and Chloroform. Aconitine is an extremely virulent poison.

Prescribing.—Not used internally. Externally, with care, in ointment.

Preparation.—*Unguentum Aconitinæ*—Ointment of Aconitine (Aconitine dissolved in Spirit, Benzoylated Lard—8 grains in 1 oz.).

The Aconitine is to be dissolved in spirit, in order to ensure the thorough diffusion of the substance through the mass.

Aconiti Folia—Aconite Leaves, 'Monkshood' Leaves.

Production.—The fresh leaves and flowering tops of *Aconitum Napellus*.

Characters.—Aconite Leaves, as seen in museums in their dried state (not official), are in pale-green fragments, narrow, and, though much broken, the palmate shape can be made out. The deep-blue flowers are usually present.

Composition.—As that of the Root. The Leaves are much less powerful.

Prescribing.—There is only one preparation: the Extract, used internally only, in pills.

Preparation.—*Extractum Aconiti*—Extract of Aconite (a green extract). *Dose.*—1 grain.

Group II.—Opium.

*45. **Opium.**—Opium.

Production.—Opium is the dried juice obtained from the unripe fruit (capsules) of the *Papaver*

Somniferum. While the fruits are unripe and growing on the stems, incisions are made round the capsules, the juice oozes out, is allowed partially to dry, scraped off, worked into masses of various size, and dried in the sun.

Characters.—There are a great many varieties of Opium, which differ very considerably in appearance, according to the place they come from. Any kind of Opium may be used for making Morphine or the other alkaloids of Opium; but for the manufacture of medicinal preparations of Opium only two kinds may be used, and these must contain not less than 9·5 per cent., or more than 10·5 per cent., of Morphine. The two official Opiums are :

Smyrna—Turkey or Levant Opium.—This is in large masses, weighing from $\frac{1}{2}$ to 2 lb. The masses are wrapped in poppy leaves, and covered with the reddish-brown fruits of a species of Dock—little triangular fruits—which can be rubbed off with the fingers. When broken, the surface is reddish-brown, granular and plastic. The odour powerful and peculiar. Taste bitter.

Constantinople Opium.—This is in masses, varying in size, and wrapped in a poppy-leaf, the flattened mid-rib of which is usually placed across the middle of the cake, and is thus very prominent. There are no fruits of the *Rumex* on the surface. The other characters are the same as those of *Smyrna* Opium.

The other varieties of Opium are of little importance to the medical student.

Recognition.—Opium in mass is at once recognised by its characteristic appearance; no other substance in the least resembles it. The student must not expect to find all the characters mentioned above always present; but the smell, which is very persistent and most peculiar and character-

istic, must be carefully noticed. It is most observable in powdered Opium, and, taken with the colour, will easily identify Opium in powder.

Composition.—Opium is an exceedingly complex substance, containing many alkaloids, neutral substances, organic acids, together with resin, gum, colouring matter, etc.

The chief alkaloids, etc., present in Opium, with the proportion in which they may occur, are :

Morphine, 5 to 20 per cent. (See below.)

Codeine, .2 to .5 per cent. (See below.)

Narcotine, 4 to 10 per cent. White, crystalline, insoluble in water. Said to have an action resembling Quinine.

Narcein, .02 to .71 per cent. White crystals, soluble in water (1 in 400). Action like Morphine. Soporific.

Thebaine (or Paramorphine), Cryptopine, Laudanine, Papaverine, and Rhædine also occur in varying proportions (not more than 1 per cent. each).

It will be seen that Morphine is present in very much larger proportion than any other alkaloid, so that the action of Opium for practical purposes is that of Morphine.

Meconin, .08 to 3 per cent. White crystals, acicular, odourless, acid.

Meconic Acid, $\text{H}_3\text{C}_7\text{HO}_7$. This is the natural acid of Opium, with which the Morphine is combined in the form of Meconate of Morphine. This salt is soluble in water. Meconic Acid occurs in nearly colourless micaceous crystals, somewhat resembling Boric Acid. Slightly soluble in water, freely so in alcohol. It is used in the 'Pharmacopœia' for making Liquor Morphinæ Bimeconatis (solution of Bimeconate of Morphine). (See Morphine.)

Lactic or Thebolactic Acid also occurs in Opium.

Prescribing.—Opium is used both externally and internally. Externally in the form of lotions, liniment, fomentations, and plaster. Internally in mixture, by means of the tincture, liquor, or wine; in pills (powdered Opium made into a pill with Glycerine or other suitable excipient), enemas and suppositories.

Dose.—3 grains.

Incompatibles.—Tannic Acid and astringent vegetable substances (remember that all alkaloids are precipitated by Tannic Acid), Arsenic, Copper, Iron, Lead, Silver and Zinc Salts, Alkalies and their Carbonates, Sal Volatile.

Solid Preparations of Opium.—For external use. *Emplastrum Opii*—Plaister of Opium (Opium in powder, Resin Plaister—1 in 10).

Unguentum Gallæ cum Opio—Ointment of Galls and Opium (Opium in powder, Ointment of Galls—32 grains in 1 oz.).

For internal use. *Confectio Opii*—Confection of Opium (Pulvis Opii Co., Syrup—1 in 40). *Dose.*—20 grains.

Extractum Opii—Extract of Opium (Aqueous—2 = 1). *Dose.*—1 grain.

Pilula Ipecac. cum Scillæ (see Ipecac.)—1 in 23. *Dose.*—10 grains.

Pilula Plumbi cum Opio (see Plumbi Acetas)—1 in 8. *Dose.*—5 grains.

Pilula Saponis Composita—Compound Soap Pill (Opium, Soap in powder, Glycerine—1 in 6). *Dose.*—5 grains.

Pulvis Cretæ Aromaticus cum Opio (see Creta Prep.)—1 in 40. *Dose.*—40 grains.

Pulvis Ipecac. Compositus (see Ipecac.)—1 in 10. *Dose.*—15 grains.

Pulvis Kino Compositus (see Kino)—1 in 20. *Dose.*—20 grains.

Pulvis Opii Compositus—Compound Powder of Opium (Opium, Black Pepper, Ginger, Tragacanth—1 in 10). *Dose*.—5 grains.

Suppositoria Plumbi Composita (see *Plumbi Acetas*)—1 grain in each.

Trochisci Opii—Opium Lozenges ($\frac{1}{10}$ grain Ext. = $\frac{1}{5}$ grain Opium in each). *Dose*.—2.

Liquid Preparations of Opium.—For external use. *Linimentum Opii*—Liniment of Opium (Tincture of Opium, Soap Liniment—1 in 2).

For internal use. *Enema Opii*—Enema of Opium (Tincture of Opium, 30 minims; Mucilage Starch, 2 oz.). One enema.

Extractum Opii Liquidum—Liquid Extract of Opium, *Liquor Opii*, 'Liquor Opii Sedativus' (Extract. Opii macerated in water, spirit added, and filtered—22 grains Extract in 1 oz.; 1 grain Morphine in 1 oz.—1 in 10). *Dose*.—40 minims.

Tinctura Camphora Compositus—'Paregoric' (see Camphor—2 grains in 1 oz.). *Dose*.—1 dram.

Tinctura Opii—Tincture of Opium, 'Laudanum' (33 grains Opium in 1 oz. Proof Spirit—3·3 grains Morphine in 1 oz.). *Dose*.—40 minims.

Tinctura Opii Ammoniata—Ammoniated Tincture of Opium, 'Scotch Paregoric' (Opium, Saffron, Benzoic Acid, Oil of Aniseed, strong solution of Ammonia, Rectified Spirit—5 grains in 1 oz.). *Dose*.—1 dram.

Vinum Opii (Extract of Opium, Cinnamon, Cloves, Sherry—22 grains Extract = 11 grains Opium in 1 oz.). *Dose*.—40 minims.

Note that Extract of Opium is double the strength of Opium itself, and that the three most commonly used liquid preparations of Opium—the Tincture, the Liquor, and the Vinum—have the same maximum dose, 40 minims.

Morphina—Morphine, Morphia; $C_{17}H_{19}NO_3$.

The alkaloid Morphine, in its free state, is not used in medicine, owing to its being easily decomposed and nearly insoluble in alcohol and water. There are four salts of Morphine in the 'Pharmacopœia'—the Hydrochlorate, Sulphate, Acetate, and Meconate. These are practically identical in medicinal action and dose, and differ merely in their solubility in water. The Acetate is the most, and the Meconate least soluble.

Morphinæ Hydrochloras—Hydrochlorate of Morphine, Muriate of Morphia, 'Morphia'; $C_{17}H_{19}NO_3 \cdot HCl \cdot 3H_2O$.

Production.—A solution of Meconate of Morphia with colouring matter, etc., is obtained by macerating Opium with water. This is evaporated and treated with Chloride of Calcium, yielding impure Hydrochlorate of Morphia and Meconate of Calcium. The Morphia Salt is collected, and digested with animal charcoal to remove colouring matter, the mixture filtered, and pure Morphine precipitated from the filtrate by Ammonia. The pure Morphine is collected, diffused in water, and sufficient Hydrochloric Acid added to neutralize and dissolve the Morphine, and finally the solution is evaporated and allowed to crystallize.

Characters.—Morphine Hydrochlorate can be had in white silky crystals, but is nearly always seen as a white powder. Taste bitter. Soluble in spirit and in water (1 in 24). Nitric acid, applied to the dry salt, gives a red colour; Ferric Chloride a blue.

Prescribing.—Rarely used externally. Internally in pills, or in solution (Liquor Morphinæ Hydrochloratis).

Dose.— $\frac{1}{2}$ grain.

Incompatibles.—Ferrie Salts, Nitric Acid, Alkalies and astringent bodies.

Preparations.—*Liquor Morphinae Hydrochloratis*—Solution of Hydrochlorate of Morphine, 'Liquor Morphinae' ($4\frac{1}{2}$ grains in 1 oz. of a mixture, S.V.R., water and dilute Acid—1 in 100). *Dose.*—50 minims.

This is the solution always to be employed when *Liquor Morphinae* is ordered. Note that all the solutions of Morphine salts, except that for hypodermic use, have practically the same strength and dose.

Suppositoria Morphinae—Morphine Suppositories (Morphine Hyd., Oil of Theobroma— $\frac{1}{2}$ grain in each). *Dose.*—1.

Suppositoria Morphinae cum Sapone—Suppositories of Morphine with Soap (Morphine Hyd., Curd Soap, Glycerine of Starch, Powdered Starch— $\frac{1}{2}$ grain in each). *Dose.*—1.

These suppositories have no advantage over those made with Oil of Theobroma, and are of doubtful solubility.

Tinctura Chloroformi et Morphinae—Compound Tincture of Chloroform and Morphine, 'Chlorodyne' (see Chloroform).

Trochisci Morphinae—Morphine Lozenges $\frac{1}{36}$ grain in each. *Dose.*—6.

Trochisci Morphinae cum Ipecacuanha (see Ipecac.)— $\frac{1}{36}$ grain in each. *Dose.*—6.

Morphinae Acetas—Acetate of Morphine, Acetate of Morphia; $C_{17}H_{19}NO_3 \cdot HC_2H_3O_2 \cdot 3H_2O$.

Production.—By dissolving freshly precipitated Morphine in dilute Acetic Acid, and evaporating.

Characters.—When freshly made, a white powder, but generally a more or less yellow powder, with a slightly acetous smell. Soluble freely in spirit and in water (1 in $2\frac{1}{2}$).

Prescribing.—Acetate of Morphine may be ordered as the Hydrochlorate, but is chiefly used for hypodermic injection in the form of *Injectio Morphinæ Hypodermica*. This solution should be colourless, or very nearly so, and must be neutral, or very slightly acid. The student must carefully notice the strength (10 per cent.), 10 times stronger than that of the other solutions containing Morphine.

Dose.— $\frac{1}{2}$ grain.

Incompatibles.—As *Morphinæ Hydrochloras*.

Preparations.—*Injectio Morphinæ Hypodermica*—Hypodermic Injection of Morphia (by dissolving freshly precipitated Morphine in water, and the smallest possible quantity of Acetic Acid—1 in 10).

Dose.—5 minims.

Liquor Morphinæ Acetatis—Solution of Acetate of Morphine (Morph. Acet., S.V.R., water, dilute Acetic Acid—1 in 100). *Dose.*—50 minims.

Morphinæ Sulphas—Sulphate of Morphine, Sulphate of Morphia; $(C_{17}H_{19}NO_3)_2 H_2SO_4 \cdot 5H_2O$.

Production.—By the same process as the Hydrochlorate, Sulphuric Acid being used instead of Hydrochloric.

Characters.—White silky crystals, or more often a white powder. But little soluble in spirit. In water (1 in 24).

Prescribing.—As Hydrochlorate of Morphine.

Dose.— $\frac{1}{2}$ grain.

Incompatibles.—As those of Morphine Hydrochlorate.

Preparation.—*Liquor Morphinæ Sulphatis*—Solution of Sulphate of Morphine (Morph. Sulph., S.V.R., water—1 in 100). *Dose.*—60 minims.

Liquor Morphinæ Bimeconatis—Solution of Bimeconate of Morphia; $C_{17}H_{19}NO_3 \cdot C_7H_4O_7$ ($1\frac{1}{4}$ per cent.)

Production.—By dissolving freshly-precipitated Morphine in water by the aid of Meconic Acid. A little spirit is added to preserve the solution.

Characters.—A colourless or slightly brown liquid.

Prescribing.—In mixture. This solution is of the same strength in Morphine as Tincture of Opium, and may be regarded as Tincture of Opium, from which the other alkaloids and matters present in Opium have been removed. The dose is the same as that of Tincture of Opium. (The student must bear in mind that children are peculiarly susceptible to the action of Opium and Morphia, and therefore their administration to infants and young children requires great caution.)

Dose.—40 minims.

Incompatibles.—As Morphinæ Hydrochloras.

Apomorphinæ Hydrochloras—Hydrochlorate of Apomorphine; $C_{17}H_{17}NO_2 \cdot HCl$.

Production.—By heating Hydrochlorate of Morphine in sealed tubes with Hydrochloric Acid to a high temperature for some hours. The contents of the tube are neutralized, the Apomorphia dissolved out, and purified by recrystallization. The student should notice that Apomorphine is Morphine from which a molecule of H_2O has been removed. Its medicinal action is entirely different from that of Morphine.

Characters.—Small gray shining crystals, often of a green tint from exposure to air. No smell. Soluble in water (1 in 7), in Alcohol (1 in 50).

Prescribing.—Apomorphine is not often given by the mouth; when so, in solution. Solutions are decomposed on boiling. It is largely used hypodermically.

Dose.— $\frac{1}{6}$ grain (by the mouth), $\frac{1}{10}$ (hypodermically).

Incompatibles.—Alkalies, Iron salts, Nitric Acid.

Preparation.—*Injectio Apomorphinæ Hypodermica*—Hypodermic Injection of Apomorphine (Apomorph. Hyd., Camphor Water—1 in 50). *Dose.*—8 minims.

The Camphor Water is used to prevent the solution from becoming mouldy or decomposing. This preparation should be freshly made.

Codeina—Codein; $C_{18}H_{21}NO_3H_2O$.

Production.—An alkaloid obtained from Opium. It may be obtained from the filtrate after the precipitation of Morphine by Ammonia; by evaporating, precipitating with Caustic Potash, and recrystallizing from Ether.

Characters.—In large colourless or slightly yellow crystals. Soluble in water (1 in 80), in spirit, and in diluted acids. Taste bitter. Codeine may be easily distinguished from Morphine or its salts by the large size of its crystals, and the fact that it gives a yellow colour instead of a red with Nitric Acid. The action is different from that of Morphine.

Prescribing.—Codein is usually prescribed in pills. Note the dose as compared with that of Morphine.

Dose.—2 grains.

Group IX.

*46. *Coca*—Coca, Coca Leaves.

Production.—The dried leaves of *Erythroxylon Coca*.

Characters.—More or less elongated oval leaves, dark green on one side, light brownish green on the other. The leaves vary usually from 1 to 2 inches in length, and from $\frac{1}{2}$ to 1 inch in breadth. The netted veins of the leaves are conspicuous, and on

closely examining a leaf a curved line of veins can be seen to run near the edge from base to apex. No particular smell.

Recognition.—The general appearance, size, shape, and the curved line distinguish Coca. Compare the leaves with the others you have to recognise (Jaborandi, Digitalis, and Senna). Jaborandi leaves, which alone at all resemble them, are larger, and quite a different colour.

Composition.—The leaves contain an important alkaloid, 'Cocain' or 'Erythroxyline,' also Hygrine, a volatile substance of a poisonous nature, and a tannic acid giving a green colour with Ferric Salts.

Prescribing.—Coca leaves have been largely used by the natives of Peru and Brazil to chew as a stimulant. The powdered leaf may be ordered in confection. Coca may be ordered in mixture by means of the Liquid Extract, or the alkaloid Cocain may be given in solution or pills. (This drug is not in any way connected with Cocoa.)

Dose (of the leaf).—2 drams.

Incompatibles.—Iron salts, Tannic matters.

Preparation.—*Extractum Cocæ Liquidum*—Liquid Extract of Coca (Maceration, Percolation, Evaporation, Proof Spirit—1 = 1). *Dose.*—2 drams.

Cocainæ Hydrochloras—Hydrochlorate of Cocain, Cocain, Cucain.

The alkaloid Cocain is not used in its free state, owing to its insolubility in water. The Hydrochlorate is the salt used.

Production.—An acidulated, alcoholic extract of the leaf is made alkaline with Carbonate of Sodium. The alkaloid separates, is dissolved out with Ether, purified, and converted into the Hydrochlorate by neutralizing with acid.

Characters.—A white crystalline powder. No

smell. Taste slightly bitter. Quickly produces a sensation of numbness on the tongue and lips. Freely soluble in Alcohol, Ether, and water.

Prescribing.—Cocain is not often used internally, when so, in pill or solution. It is very largely used externally, and by hypodermic injection, in solutions of all strengths up to 20 per cent. Such solutions should be made with boiled distilled water, and should contain a little Salicylic Acid or Boric Acid as a preservative. The latter is by far the most suitable substance. Cocain may be also used in ointments, suppositories, etc., and in the B.P. Lamellæ.

Dose.—1 grain.

Incompatibles.—Alkalies, Permanganate of Potash.

Preparations.—*Lamellæ Cocainæ*—Disks of Cocain ($\frac{1}{200}$ grain of Hydrochlorate in each).

Liquor Cocainæ Hydrochloratis—Solution of Hydrochlorate of Cocain (Cocain Hyd., Salicylic Acid, Boiled Distilled Water—10 per cent.). *Dose.*—10 minims.

Group X.

*47. **Jaborandi** — Jaborandi, Pilocarpi Foliola, Jaborandi Leaves.

Production.—The dried leaflets of Pilocarpus Pennatifolius.

Characters.—Jaborandi leaflets are about the size and shape of common Laurel leaves. The colour varies from dark green to brown, the under surface being a little lighter than the upper, and showing a prominent midrib. On holding the leaf up to the light, a number of translucent dots (oil glands) can be seen. No particular smell.

Recognition.—Note the general shape and colour

of the leaf, the prominent midrib, and translucent dots. On looking at the apex of each leaf, a little notch will be found. This character (emarginate apex) at once distinguishes Jaborandi. Compare with Coca and Digitalis.

Composition.—An important liquid alkaloid, 'Pilocarpine,' or 'Jaborandine' (up to 1 per cent.). 'Jaborine,' an alkaloid present in small quantity, and volatile oil (.5 per cent.) are the chief constituents.

Prescribing.—Jaborandi, like Coca, may be chewed, or the powdered leaf given in confection. Pills may be made of the Extract, and the Infusion and Tincture given in mixture. The Tincture is the most valuable and useful preparation.

Dose (of the leaf).—1 dram.

Incompatibles.—Tannin bodies, Iron Salts.

Preparations.—*Extractum Jaborandi*—Extract of Jaborandi (an Alcoholic Extract). *Dose.*—10 grains.

Infusum Jaborandi—Infusion of Jaborandi (1 oz. to 1 pint—30 minutes). *Dose.*—2 oz.

Tinctura Jaborandi—Tincture of Jaborandi (Jaborandi, 5 oz.; Proof Spirit, 1 pt.—Maceration and Percolation). *Dose.*—1 dram.

Pilocarpinæ Nitrās—Nitrate of Pilocarpine;
 $C_{11}H_{16}N_2O_2HNO_3$.

Production.—By treating Extract of Jaborandi with an alkali. Pilocarpine is thus set free; this is dissolved out with Chloroform, the Chloroform evaporated, the residue neutralized with Nitric Acid, and the salt recrystallized.

Characters.—A white crystalline powder. Deliquescent. Soluble in water (1 in 9), slightly in spirit.

Prescribing.—Pilocarpine may be given in pill, but is best ordered in solution. It is frequently

given by hypodermic injection. Sometimes used externally in lotions for the eye.

Dose.— $\frac{1}{2}$ grain.

Incompatibles.—Alkalies, Tannic matters.

Group XI.—Bitter Substances.

*48. *Quassia Lignum*—Quassia Wood, 'Bitter Wood.'

Production.—The wood (in chips, shavings, or raspings) of *Picræna Excelsa*.

Characters.—Quassia Wood is imported in billets or logs, covered with a dark gray bark ; it is, however, usually seen in the form of chips. These are of a pale yellowish-white colour, tough and porous, and very bitter when chewed. They have no smell.

Recognition.—Quassia is easily recognised by its peculiar general appearance. All the other woods of the B.P. are highly coloured ; moreover, it is the only substance in chips to be recognised.

Composition.—Quassia contains a neutral bitter principle, 'Quassin,' soluble in cold water (·08 per cent.). A little resin. No Tannic Acid is present.

Prescribing.—Quassia may be given in pill in the form of the Extract, but the liquid preparations (the Infusion and Tincture) are far preferable. As the wood (unlike most bitter substances), contains no tannin, it may be safely prescribed with Iron Salts. Infusion of Quassia is sometimes used as an injection.

Preparations.—*Extractum Quassia*—Extract of Quassia (an Aqueous extract). *Dose.*—5 grains.

Infusum Quassia—Infusion of Quassia (Quassia, 110 grs. ; Cold Water, 1 pt.—30 minutes). *Dose.*—2 oz.

Note that this preparation is made with cold

water—cold water extracting all the properties as well as hot water.

Tinctura Quassiae—Tincture of Quassia (Proof Spirit, Maceration— $\frac{3}{4}$ oz. in 1 pt.). *Dose*.—2 drams.

*49. *Calumbæ Radix*—Calumba Root, Columba Root.

Production.—The sliced root of *Jateorrhiza Calumba*.

Characters.—Flat, more or less circular slices, from $\frac{1}{8}$ to $\frac{1}{2}$ inch thick, the centre of each slice slightly concave. Colour, light brownish-yellow, the edge of each slice covered with a dark brown skin. A dark line runs round each piece near the edge. No particular smell; taste bitter. Brittle, the broken edges having a mealy appearance.

Recognition.—The appearance of Calumba Root is most characteristic. Note the concave depression on each side of the slice, and the dark line running near the edge; also the characteristic colouring. Some pieces are worm-eaten and exhibit small holes.

Composition.—Calumba contains a bitter principle, 'Calumbin'; a yellow substance, 'Berberine,' to which the colour of the drug is due; an organic acid, 'Calumbic Acid'; and about 33 per cent. of Starch. No Tannic Acid is present.

Prescribing.—Calumba Root may be given in powder, but this method is seldom used. The Extract in pills, but the most valuable preparations of the drug are the Infusion and Tincture. These may be prescribed with Iron Salts.

Dose (of the powdered root).—20 grains.

Preparations.—*Extractum Calumbæ*—Extract of Calumba (a Proof Spirit Extract). *Dose*.—10 grains.

Infusum Calumbæ—Infusion of Calumba (*Cold*

Water, 1 oz. in 1 pint—30 minutes). *Dose*.—2 oz.

Note that this preparation is made with *cold* water. This is in order to avoid swelling and dissolving out the starch, and thus forming a jelly-like mixture.

Tinctura Calumbæ—Tincture of Calumba (Proof Spirit, Maceration and Percolation—2½ oz. in 1 pint.) *Dose*.—2 drams.

Calumba Root is contained in Mist. Ferri Aromatica.

*50. *Gentianæ Radix*—Gentian Root.

Production.—The dried root of *Gentiana Lutea*.

Characters.—Gentian Root is in long cylindrical pieces of a light brown colour ; the outer surface is much wrinkled. Internally the root is spongy and of a light orange brown colour. A dark red line runs near the outside bark. The odour is fragrant and peculiar.

Recognition.—The peculiar odour at once distinguishes Gentian. The student should also notice the colour, spongy nature, and the dark red line mentioned above.

Composition.—Gentian contains a bitter principle, 'Gentiopicroin'; an organic acid, 'Gentisic Acid'; and about 15 per cent. of a peculiar sugar. A little Tannic Acid is also present.

Prescribing.—Gentian may be given in the form of Extract in pills, and in mixtures by means of the Infusion and Tincture ; these are very largely used. Gentian should not be ordered with Salts of Iron.

Incompatibles.—Iron Salts, Lead and Silver Salts.

Preparations.—*Extractum Gentianæ*—Extract of Gentian (an Aqueous Extract). *Dose*.—10 grains.

Infusum Gentianæ Compositum—Compound Infusion of Gentian (Gentian, Orange-peel, Lemon-peel—110 grs. to 1 pint). *Dose*.—2 oz.

Tinctura Gentianæ Compositum—Compound Tincture of Gentian (Gentian, Orange-peel, Cardamom Seeds, Proof Spirit, Maceration and Percolation— $1\frac{1}{2}$ oz. in 1 pint). *Dose*.—2 drams.

Group XII.

*51. **Physostigmatis Semen**—Calabar Bean, *Physostigmatis Faba*, 'Ordeal Bean of Old Calabar.'

Production.—The dried seeds of *Physostignia Venenosum*.

Characters.—Beans rather larger than ordinary horse beans, more or less kidney-shaped, with a dark, rough, chocolate-coloured skin. A broad black furrow runs entirely along the convex side. No smell. Inside the nucleus is white and brittle, and has little taste. The beans are poisonous.

Recognition.—The beans are easily recognised after seeing them once; there is no drug in the 'Pharmacopœia' at all resembling them. Note the colour, size, and the broad black furrow.

Composition.—Calabar Bean contains an important alkaloid, 'Physostigmine,' or 'Eserine'; another less important alkaloid, 'Calabarine'; and a neutral substance, 'Physosterine,' resembling Cholesterine.

Prescribing.—Calabar Bean may be given in powder, as pills, but this is rarely done. The Extract (in pills) is largely used.

Dose (of the powdered bean).—4 grains.

Preparation.—*Extractum Physostigmatis*—Extract of Calabar Bean (an Alcoholic Extract). *Dose*.— $\frac{1}{4}$ grain.

Physostigmina—Physostigmine, Eserine.

Production.—By adding Bicarbonate of Sodium to a solution of Extract of Calabar Bean in water.

The alkaloid separates, is dissolved out with Ether, and the Etherial liquid evaporated.

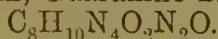
Characters.—In colourless or pinkish crystals, but, owing to its deliquescence, often in the form of a red semi-solid. Slightly soluble in water, freely so in Alcohol.

Prescribing.—Physostigmine, or, as it is more often called, Eserine, is not often used internally. Externally in the B.P. Lamellæ, and in solutions for the eye. Sulphate of Eserine is often used instead of the alkaloid. Solutions of Eserine are colourless and stable.

Preparation.—*Lamellæ Physostigminæ*—Disks of Physostigmine ($\frac{1}{1000}$ grain in each).

Group XIII.

Caffeina—Caffèin, Guaranine Theine ;



Production.—An alkaloid obtainable from Tea, Coffee, or Guarana (the seeds of Paullinia Sorbilis). Nearly all the Caffèin used, however, is prepared from Tea. Colouring matter, Tannin, etc., is removed from an infusion, and on evaporation this deposits Caffèin. Tea contains up to 4·5 per cent. of Caffèin, Coffee to 1·5 per cent., Guarana up to 5 per cent.

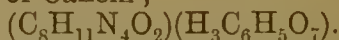
Characters.—White, silky masses of needles, somewhat resembling Quinine, but larger. Slightly soluble in water (1 in 80), more so in spirit. No smell ; taste bitter.

Prescribing.—Caffèin may be prescribed in pills, powders, or in solution. It may also be given in wine or diluted spirit. A cup of tea is frequently the most satisfactory way of exhibiting Caffèin.

Dose.—5 grains.

Incompatibles.—Tannic matters, Salts of Mercury, Iodide of Potassium.

Caffeinæ Citras—Citrate of Caffein ;



Production.—By dissolving Caffein in a solution of Citric Acid, and evaporating to dryness. Caffein Citrate is not a true compound, but a mixture of Citric Acid and Caffein.

Characters.—A white powder, with an acid taste, soluble in water (1 in 10).

Prescribing.—This has no advantage over Caffein itself, except that it is more soluble in water. It is prescribed in solution.

Dose.—10 grains.

Incompatibles.—Alkalies and Alkaline Carbonates, and those of Caffein.

Group XIV.

*52. **Conii Fructus** — Conium Fruit, Hemlock Fruit.

Production.—The fruit of Conium Maculatum.

Characters.—These fruits somewhat resemble ordinary Caraway seeds, but are shorter, broader, and lighter in colour. Conium fruit are semi-lunar in shape, and of a greenish-yellow colour; each fruit has 5 prominent light-coloured ridges. When the fruits are bruised and mixed with a little Potash, a peculiar smell is developed, suggestive of mice. The dry fruits have no smell.

Recognition.—Note the general appearance and peculiar shape. There is no particular characteristic.

Composition.—Conium contains an important liquid volatile alkaloid, 'Conine'; two derivatives from Conine, 'Methylconine' and 'Conhydrine'; and Malic Acid.

Prescribing.—See *Conii Folia*.

Incompatibles.—Alkalies, astringent substances, vegetable acids.

Preparation.—*Tinctura Conii*—Tincture of Hemlock (Proof Spirit, Maceration and Percolation—2½ oz. in 1 pint). *Dose.*—1 dram.

Conii Folia—Hemlock Leaves.

Production.—The fresh leaves of *Conium Maculatum*.

Characters.—*Conium* leaves, when fresh, are of dark green colour, much divided, and having a more or less powerful odour (especially when treated with Potash), suggestive of mice. The stem on which they grow is marked with dark purple spots.

Composition.—As that of the fruit.

Prescribing.—Hemlock may be given in pills by means of the extract or the powdered leaf, but the liquid preparations (the *Succus* and *Tincture*) in mixtures are preferable. Hemlock by inhalation (*Vapor Coninæ*) is often used. Externally, *Poultice* and *Ointment* of Hemlock are used, but they are preparations of doubtful value.

Dose (of the leaf).—8 grains.

Incompatibles.—See Hemlock Fruit.

Preparations.—*Extractum Conii*—Extract of Hemlock (a green extract). *Dose.*—6 grains.

Pilula Conii Composita—Compound Pill of Hemlock (Ext. *Conii*, *Ipecac.* in powder, Treacle). *Dose.*—10 grains.

Succus Conii—Juice of Hemlock. *Dose.*—1 dram.

Cataplasma Conii—Hemlock Poultice (Hemlock Juice, Linseed Meal, Boiling Water—1 oz. succus in each poultice).

Unguentum Conii—Hemlock Ointment (Hemlock Juice, Hydrous Wool Fat, Boric Acid—2 oz. evaporated to 2 drs., with ¾ oz. wool fat).

Vapor Conine.—Vapour of Conine (Hemlock Juice, $\frac{1}{2}$ oz. ; Liq. Potas., 1 dram ; Water, 1 oz.).
Dose.—20 minims.

The student should notice that this is an inhalation of the alkaloid Conine.

Group XV.—Asafœtida and Allied Substances.

*53. Asafœtida—Asafœtida.

Production.—A gum resin obtained from *Ferula Narthex* and *Scorodosma*.

Characters.—In reddish-brown masses, consisting of small tears stuck together. Opaque white when freshly broken, but changing gradually to pink or brown. Odour extremely persistent, penetrating, and onion-like.

Recognition.—Asafœtida is at once recognised by its characteristic odour.

Composition.—Asafœtida is a mixture of Essential Oil (8 to 9 per cent.), Resin (up to 65 per cent.), and Gum (30 per cent.). The Essential Oil contains Sulphur, and is allied to the Essential Oil of Garlic.

Prescribing.—Asafœtida being a gum resin, an emulsion can be made by rubbing the Asafœtida with water, and straining ; in this way Enema Asafœtida is made. It is often desirable that the patient should experience the nauseous taste of the drug. The tincture may then be given in mixture with a little Acacia or Tragacanth ; or Asafœtida, when not desired to be tasted, may be given in pills.

Dose.—20 grains.

Preparations.—*Enema Asafœtidæ*.—Enema of Asafœtida (Asafœtida, 30 grs. ; Water, 4 oz.).

Pilula Aloes et Asafœtidæ.—Pill of Aloes and Asafœtida (Socotrine Aloes, Asafœtida, Hard Soap, Confection of Roses—1 in 4). *Dose*.—5 grains.

Pilula Asafœtidæ Composita.—Compound Pill of

Asafoetida, Pilula Galbani Composita (Asafoetida, Galbanum, Myrrh, Treacle—1 in $3\frac{1}{2}$). *Dose*.—10 grains.

Tinctura Asafoetidar — Tincture of Asafoetida (Rectified Spirit, Maceration— $2\frac{1}{2}$ oz. in 1 pint). *Dose*.—1 dram.

Note that this preparation contains the resin and volatile oil only of the drug, and therefore needs an emulsifying agent to form a proper mixture with water. A little mucilage of Tragacanth may be placed in the bottle, the tincture added, the mixture shaken, and the bottle filled up.

*54. **Ammoniacum**—Ammoniacum.

Production.—A gum resin from Dorema Ammoniacum.

Characters.—Ammoniacum is in distinct separate tears or masses, varying in size from a pea to a walnut; these masses are of a light cinnamon brown colour outside, brittle, and when broken the surface is white and shining. The odour is peculiar and not at all onion-like.

Recognition.—Ammoniacum is recognised by its appearance, distinct and separate tears, colour and fracture, and by its faint but very characteristic odour. The student is advised to make a careful comparison of all the drugs in this group (XV.) with each other, and especially to distinguish between Asafoetida, Myrrh, and Ammoniacum.

Composition.—Contains a volatile oil (2·8 per cent.), which contains no sulphur. Resin (65 to 72 per cent.), and Gum, varying in amount up to 24 per cent.

Prescribing.—Ammoniacum may be given in mixture; rubbed down with water it forms an emulsion. It is not very disagreeable to take. It can also be given in pills. Externally it is combined with other drugs to form plasters.

Dose.—20 grains.

Incompatibles.—Alkalies and Chlorinated bodies.

Preparations. — *Emplastrum Ammoniaci cum Hydrargyro*—Plaster of Ammoniacum with Mercury (Ammoniacum, Mercury, Olive Oil, Sulphur—4 in 5).

Emplastrum Galbani—Galbanum Plaster (Galbanum, Ammoniacum, Yellow Wax, Lead Plaster—1 in 11).

Mistura Ammoniaci — Ammoniacum Mixture (Ammoniacum, Water; rub and strain—1 in 32).

Dose.—1 oz.

Pilula Scillæ Composita—Compound Squill Pill (1 in 6). See Squill.

Pilula Ipecac. cum Scilla (see Ipecac.)—1 in 7.

*55. **Myrrha**—Myrrh.

Production.—A gum resin from *Balsamodendron Myrrha*.

Characters. — In roundish tears or masses of tears, varying much in size. Colour a dusty red externally; on breaking one of the pieces the surface is oily, somewhat translucent, and of a rich brown colour. Odour peculiar, fragrant, and agreeable.

Recognition.—Myrrh is easily recognised by its red colour, general appearance, and especially characteristic agreeable odour.

Composition. — Myrrh consists of Volatile Oil (.75 per cent.), Gum (from 45 to 75 per cent.), and Resin (35 per cent.).

Prescribing.—Myrrh may be given in emulsion like Galbanum, or in pills, but is not much used alone internally. It is largely used in the form of the tincture, with water, in mouth washes, gargles, etc., and in the powdered state in tooth-powders.

Dose.—30 grains.

Preparations. — *Pilula Aloes et Myrrhæ* — Pill of Aloes and Myrrh (1 in 6). See Aloes.

Tinctura Myrrhæ — Tincture of Myrrh (Rectified Spirit, Maceration and Percolation). *Dose.* — 1 dram.

This preparation contains the resin and volatile oil alone (for dispensing see Tincture of Asafoetida). The residue left in making Tincture of Myrrh is gum, and can be dissolved in water to form mucilage.

Myrrh is also contained in *Decoctum Aloes Compositum*, *Mistura Ferri Composita*, *Pilula Asafoetidæ Composita*, *Pilula Rhei Composita*.

*56. *Guaiaci Resina* — Guaiacum Resin.

Production. — The resin obtained from the wood *Guaiacum Officinale* and *Sanctum* ('*Lignum Vitæ*').

Characters. — In round or oval tears or in masses. The masses are slightly powdery on the outside and usually present a distinctly green appearance. The resin is brittle, the broken surface being glassy and of a brown colour. Thin pieces are translucent, brown in colour. No marked odour unless in powder. Powdered Guaiacum Resin when fresh is gray, but if it has been kept a little time has a green colour. Odour balsamic.

Recognition. — The green colour of the masses, glassy fracture, and absence of marked odour, distinguish Guaiacum Resin. The student must beware of confounding it with aloes and kino. The appearance of aloes is different, and its odour most marked. Kino is in very small pieces, colour red, and no odour.

Composition. — Very complex, contains three resin acids — 'Guaiaconic,' 'Guaiaretic,' and 'Guaiacic' Acids — a variety of resin, 'Guaiac Beta Resin,' and a colouring matter, 'Guaiac Yellow.'

Prescribing.—Guaiacum Resin may be given in mixture, the powdered resin rubbed down with a little mucilage, or powdered acacia gum, and water added. The taste is nauseous, and some flavouring agent should be added. *Tinctura Guaiaci Ammoniata* is largely used; it needs suspending in water (see *Tinctura Asafœtidæ*). Guaiacum Resin is also given in powder with Sulphur and other drugs.

Dose.—30 grains.

Incompatibles.—Acids, Spirit of Nitrous Ether.

Preparations.—*Mistura Guaiaci*—Guaiacum Mixture (Guaiacum Resin, Sugar, Gum Acacia, Cinna-mon Water—11 grains in 1 oz.). *Dose.*—2 oz.

Tinctura Guaiaci Ammoniata—Ammoniated Tincture of Guaiacum (made with Sp. Ammon. Arom., Maceration—4 oz. in 1 pint). *Dose.*—1 dram.

Guaiacum Resin is used in *Pil. Hydrarg. Subchlor. Co.*

Group XVI.

Cinchonæ Cortex—Cinchona Bark, 'Peruvian Bark.'

Production.—The dried bark of very many species of Cinchona, the chief being *C. Calisaya*, *C. Officinalis*, *C. Lancifolia*, *C. Succirubra*.

Characters.—The 'Pharmacopœia' permits the use of any variety of Cinchona Bark for the manufacture of the alkaloids of Cinchona. These barks vary very much in appearance, and their characters are of no importance to a medical student. The student is, however, expected to be familiar with the characters of Red Bark (*C. Succirubra*, see below), and should remember that this bark is alone used in the 'British Pharmacopœia' for preparations of Cinchona. Red bark contains all the alkaloids of

Cinchona, and its composition is therefore typical of a Cinchona Bark.

Composition.—See *Cinchonæ Rubræ Cortex*.

Preparations.—*Cinchonidine Sulphas*, *Cinchonine Sulphas*, *Quinine Hydrochlorus*, *Quinine Sulphas*.

***57. Cinchonæ Rubræ Cortex**—Red Cinchona Bark, Red Peruvian Bark.

Production.—The dried bark of *Cinchona Succirubra*.

Characters.—Red Cinchona Bark is in rolls, or more or less curved pieces. These vary in length from a few inches to a foot or more. The outer surface is rough and furrowed, and of a brownish-red colour; the inner surface a deep brick-red. The bark has no particular smell.

Recognition.—The general appearance, colour, etc., distinguish Red Cinchona Bark; no other drug in the least resembles it. It is the only bark the student has to recognise.

Composition.—Cinchona Bark contains 4 alkaloids: 'Quinine,' 'Quinidine' (these are isomeric with each other, and differ but slightly in their physical properties); 'Cinchonine,' 'Cinchonidine' (also isomeric with each other, and differing but little in properties).

Two organic acids: 'Kinic' or 'Quinic Acid,' closely allied to Benzoic Acid; and 'Kinovic Acid' or 'Kinova Bitter,' a white amorphous body.

A variety of tannic acid, 'Cincho-Tannic Acid,' giving a green colour with Ferric Chloride. This acid is easily oxidized, forming a red insoluble substance, 'Cinchona Red'; this is the body, often deposited by preparations of Cinchona. Cinchona contains a very little volatile oil. It should be remembered that the action of all the alkaloids of Cinchona Bark is similar, but Quinine is by far

the most powerful and valuable. The proportion of alkaloids varies with the variety of bark. Red Bark for medicinal purposes must not contain less than 5 to 6 per cent. of total alkaloids, of which at least half must be Quinine and Cinchonidine. A process for estimation is given in the 'British Pharmacopœia.'

Prescribing.—Cinchona Bark may be given in powder, but the liquid preparations are more useful and convenient; the incompatibles should be remembered.

Dose (of the powdered bark).—15 grains to 2 drams.

Incompatibles.—Metallic Salts, Alkalies, especially Ammonia and Lime-water.

Preparations.—*Decoctum Cinchonæ*.—Decoction of Cinchona (ten minutes, $1\frac{1}{4}$ oz. to 1 pint). *Dose.*—2 oz.

Extractum Cinchonæ Liquidum.—Liquid Extract of Cinchona (a 'Standardized' preparation contains 5 per cent. of the mixed alkaloids of Cinchona).

Powdered Cinchona is exhausted with a mixture of Glycerine, Water, and Hydrochloric Acid, by Maceration and Percolation. The liquid is evaporated, 50 fluid grains taken, made alkaline with solution of soda, and the alkaloids dissolved out by shaking with Benzolated Amylic Alcohol. On separating and evaporating the alcoholic solution, the alkaloids present are obtained, and can be weighed. The extract is now evaporated or diluted, so that 85 parts contain 5 of total alkaloids, and sufficient spirit added to make the volume 100. *Dose.*—10 minims.

Infusum Cinchonæ Acidum.—Acid Infusion of Cinchona (Red Bark in powder 1 oz., Aromatic Sulph. Acid 2 drams, Water 1 pint; one hour). *Dose.*—2 oz.

Tinctura Cinchonæ—Tincture of Cinchona (Proof Spirit, Maceration and Percolation—4 oz. to 1 pint).
Dose.—2 drams.

Tinctura Cinchonæ Composita—Compound Tincture of Cinchona (Red Bark, Orange Peel, Serpentry Root, Saffron, Cochineal, Proof Spirit; Maceration and Percolation—2 oz. to 1 pint).
Dose.—2 drams.

Red Cinchona Bark is also contained in *Mist. Ferri Aromatica*.

*58. *Quininæ Sulphas*—Sulphate of Quinine, 'Quinine,' Sulphate of Quinia; $(C_{20}H_{24}N_2O_2)_2(H_2SO_4)_2 \cdot 15H_2O$.

Production.—An acid aqueous infusion of Cinchona or Remijia Bark is prepared, and made alkaline with lime or other alkali. Quinine is thus set free, and is dissolved out with spirit, neutralized with Sulphuric Acid, and the resulting Quinine Sulphate purified by charcoal and recrystallization.

Characters.—A mass of very small, silky-white needles, soft and velvety to the touch. No smell; taste intensely bitter. But little soluble in water (1 in 800), the aqueous solution having a very marked blue fluorescence. Freely soluble in all dilute acids. Soluble in ammonia and alcohol.

Sulphate of Quinine is rarely quite pure, and generally contains Sulphates of Cinchonine, Cinchonidine, Quinidine, and occasionally Cupreine (an alkaloid present in Remijia Bark). According to the 'British Pharmacopœia,' Sulphate of Quinine must not contain more than 5 per cent. of sulphates of other alkaloids. Tests are given in the 'Pharmacopœia.'

Recognition.—The general appearance and peculiar soft and velvety feel distinguish Quinine. Compare it with Benzoic Acid (which is aromatic), with Salicylic Acid (which is larger and has a harsh

feel), and with Gallic Acid (which is larger, and of a yellow colour).

Prescribing.—Sulphate of Quinine may be given in pill; a very small quantity of strong Sulphuric Acid is the best excipient. In powder large doses are less tasted than when in solution. In mixtures Quinine is dissolved in dilute acid (Sulphuric, Phosphoric, Hydrobromic, etc.); 1 minim of dilute acid may be used for each grain of Quinine Sulphate.

Externally Quinine, dissolved in the least possible quantity of dilute acid, is used as a lotion for the eyes and as an injection.

Dose.—1 to 10 grains.

Incompatibles.—Astringent substances, Alkalies and their Carbonates, Iodine.

Preparations.—*Tinctura Quininæ Ammoniata*—Ammoniated Tincture of Quinine (Quinine Sulphate, Solution of Ammonia, Proof Spirit—1 grain in 1 dram). *Dose.*—2 drams.

This preparation precipitates with water. When dispensing it, it should be mixed with a little mucilage in a measure, and the mixture poured into the water.

Vinum Quininæ—Quinine Wine (Quininæ Sulphas, Citric Acid, Orange Wine—1 grain in 1 oz.). *Dose.*—1 oz.

Sulphate of Quinine is used in making *Ferri et Quininæ Citras*.

Quininæ Hydrochloras—Hydrochlorate of Quinine.

Production.—By the same process as the Sulphate, using Hydrochloric instead of Sulphuric Acid.

Characters.—In crystals like Quinine Sulphate, but larger. Soluble in water (1 in 34), in spirit (1 in 3).

This salt is identical in action and dose with the Sulphate, but is more soluble in water.

Prescribing.—In solution in water.

Dose.—1 to 10 grains.

Preparation.—*Tinctura Quininæ*—Tincture of Quinine (Quinine Hydrochlorate, Tincture of Orange-peel—1 grain in 1 dram. *Dose.*—2 drams.

Group XVII.

Salicinum—Salicine, Salicin; $C_{13}H_{18}O_7$.

Production.—A glucoside prepared from willow bark, *Salix Alba*. It may be made by the same process as Caffeine (q.v.).

Characters.—A light, white crystalline powder. Taste very bitter. Soluble in water (1 in 28) and in spirit. Sulphuric Acid colours it red.

Prescribing.—Salicin may be ordered in powders, to be dissolved in water, or in solution in mixtures.

Dose.—20 grains.

Group XVIII.—Ipecacuanha and Allied Drug.

*59. **Ipecacuanha**—Ipecacuanha.

Production.—The dried root of *Cephaelis Ipecacuanha*.

Characters.—In pieces about the thickness of a quill, from 2 to 4 inches long, and more or less twisted. The root has a ringed necklace-like appearance, and on looking at the transverse section may be seen to consist of a white central axis surrounded by a yellow-brown portion. The exterior of the root is of a grayish-brown colour. There is no marked smell to the entire root. The powdered drug has a faint peculiar odour.

Recognition.—The peculiar ringed necklace-like appearance is distinctive of *Ipecacuanha*; note also the colour and characteristic section.

Composition. — Ipecacuanha contains an important alkaloid, 'Emetine' (up to 1 per cent.), an organic acid 'Ipecacuanhic' or 'Cephaëlic Acid,' a trace of Volatile Oil, Sugar, and Gum.

Prescribing.—Ipecacuanha may be given in small doses in pill, larger doses in powder. Wine and Vinegar of Ipecacuanha are much used in mixtures. It is occasionally used externally in the form of powder.

Dose (of the powdered drug).—2 grains (as an expectorant), 30 grains (as an emetic).

Incompatibles.—Alkalies, Astringents.

Preparations.—*Acetum Ipecacuanhæ*—Vinegar of Ipecacuanha (Powdered Ipecac., Dilute Acetic Acid, Maceration and Percolation — 1 oz. to 1 pint). *Dose.*—40 minims.

Pilula Ipecacuanhæ cum Scilla—Pill of Ipecac. with Squill (Pulv. Ipecac. Co., Squill, Ammoniacum, Treacle). *Dose.*—10 grains (1 Opium and 1 Ipecac. in 23).

Pulvis Ipecacuanhæ Compositus — Compound Powder of Ipecac., Pulvis Doveri, 'Dover's Powder' (Ipecac., Sulphate of Potash, Opium—1 Opium and 1 Ipecac. in 10). *Dose.*—15 grains.

Trochisci Ipecacuanhæ — Ipecacuanha Lozuges ($\frac{1}{2}$ grain in each). *Dose.*—3.

Trochisci Morphine et Ipecacuanhæ—Lozenges of Morphine and Ipecac. ($\frac{1}{32}$ grain Morph. Hyd., $\frac{1}{12}$ grain Ipecac. in each). *Dose.*—6.

Vinum Ipecacuanhæ—Ipecacuanha Wine (Ipecacuanha in powder is macerated, and percolated with Acetic Acid, the product evaporated to dryness, and the powdered dry residue macerated in sherry—1 oz. in 1 pint). *Dose.*—40 minims as an expectorant, 6 drams as an emetic.

Ipecacuanha is also contained in Pil. Conii Composita.

*60. *Senegæ Radix*—Senega Root.

Production.—The dried root of *Polygala Senega*.

Characters.—Each piece consists of an irregular knotty lump, from which proceeds a tapering root, which is generally curved and twisted, and often branched. Externally the root is a light yellowish brown. The odour is faint but peculiar, somewhat suggestive of cherries.

Recognition.—Note the colour, odour, and peculiar, knotty appearance of each piece. On examining a root carefully a more or less perfect and prominent ridge or sinew of bark will be found running the entire length of each root ; this character (' the keel ') at once distinguishes Senega Root.

Composition. — Senega contains a glucoside ' Senegin,' which is probably identical with ' Saponin.' This substance is the cause of the frothing of aqueous preparations of Senega when shaken. Two organic acids, ' Malic ' and ' Virgineic.' Resin and a little Volatile Oil.

Prescribing.—Senega is used in mixture only in the form of infusion and tincture. These preparations are emulsifying agents, and a few drops of the tincture (shaken with the oil and water) may sometimes be used to quickly prepare an emulsion.

Preparations. — *Infusum Senegæ* — Infusion of Senega (1 oz. to the pint—30 minutes). *Dose*.—2 oz.

Tinctura Senegæ — Tincture of Senega (Proof Spirit, Maceration and Percolation—2½ oz. in 1 pint). *Dose*.—2 drams.

Group XIX.

*61. **Glycerinum**—Glycerine, Glycerol, Propenyl Alcohol ; $C_3H_5(OH)_3$.

Production.—By the decomposition of certain oils and fats with alkalies ('Saponification,' see fixed oils), or by treating the oils and fats with superheated steam. It is purified by distillation.

Characters.—Absolutely pure and anhydrous glycerine can be obtained as a colourless solid, but it is always seen in the form of a clear colourless oily fluid, without smell and with a sweet taste. Freely miscible in all proportions with water and alcohol. It is a powerful solvent for many substances.

Recognition.—The clear, colourless, oily nature, and absence of smell, distinguish glycerine. The other colourless liquids the student has to recognise have all characteristic odours and are not oily.

Prescribing.—Externally, glycerine is largely used alone, or, mixed with water, as an emollient to the skin. It is hygroscopic, and renders the skin dry. It is rapidly absorbed by the skin, and is therefore a useful medium for dissolving substances which are to be absorbed. Owing to its sticky tenacious character it is a valuable solvent for drugs which are intended to exert a prolonged local action, in paints for the throat, etc.

Internally, Glycerine is much used as an injection, and in the form of suppositories. By the mouth it is given as a substitute for Cod Liver Oil (as a nutrient), and, owing to its sweet taste, it may be used for flavouring mixtures.

Incompatibles.—Permanganate of Potassium.

Dose.—2 drams.

Preparations.—*Glycerines*—These are solutions of drugs in glycerine intended for local application

(see under each drug). Glycerine of Tragacanth is a useful excipient for most pills.

Suppositoria Glycerini — Suppositories of Glycerine (Gelatine, Glycerine, Water—70 per cent. Glycerine). These may be made of any size required; each will contain 70 per cent. by weight of Glycerine.

Glycerine is also used in various Pilulæ, Lini-
menta, in the Lamellæ, Extract. Cinchonæ Liquid.,
Mel Boracis, Tinctura Kino and Unguentum Iodi,
for the sake of its physical properties only.

Group XX.

*62. *Nux Vomica* — *Nux Vomica*, 'Bachelors' Buttons.'

Production. — The seeds of *Strychnos Nux Vomica*.

Characters.—Flat circular beans about an inch in diameter. Grayish green in colour, and covered with short satiny hairs. The seeds are very tough and horny, translucent when cut. No odour, and taste very bitter. The seeds are highly poisonous.

Recognition. — The flat circular shape, colour, and satiny appearance, at once distinguishes *Nux Vomica*. No other drug at all resembles it.

Composition. — *Nux Vomica* contains two important alkaloids, 'Strychnine' and 'Brucine,' an organic acid, 'Igasuric' or 'Strychnic Acid,' and a glucoside, 'Loganin.' The two alkaloids have the same medicinal action, but Strychnine is very much the more powerful and rapid of the two.

Prescribing.—*Nux Vomica* is largely given in pills by means of the Extract, and in mixture by means of the Tincture.

Incompatibles.—Iron Salts, Astringents.

Preparations. — *Extractum Nucis Vomicae*—Ex-

tract of Nux Vomica (a 'Standardized' Extract containing 15 per cent. of the mixed alkaloids—Strychnine and Brucine). The powdered seed is exhausted with a mixture of spirit and water, 1 oz. of this liquid taken and the alkaloids estimated in it. A volume of the liquid is then taken containing a known quantity of the alkaloids, and evaporated, so that the final product contains 15 per cent. of total alkaloids. *Dose*.—1 grain.

Tinctura Nucis Vomice.—Tincture of Nux Vomica (Extract of Nux Vomica 133 grains, in 1 pint spirit and water—'Standardized' 1 oz. contains 1 grain Alkaloids). *Dose*.—20 minims.

*63. **Strychnina**.—Strychnine, Strychnia;



Production.—A liquid extract of Nux Vomica is prepared with alcohol and water. The alcohol is got rid of by distillation, and to the remaining liquid, solution of Acetate of Lead is added. Colouring matter, etc., is precipitated. The solution is filtered, the filtrate concentrated, and the mixed alkaloids precipitated by ammonia. The precipitate is collected, dried, dissolved in spirit, and the solution concentrated and allowed to stand. Then the Strychnine separates out, leaving the Brucine in solution.

Characters.—In small white shining elongated crystals. Very little soluble in water, but the aqueous solution is intensely bitter, very little soluble in alcohol. Soluble in strong Sulphuric Acid, forming a colourless solution, which if touched with a crystal of Bichromate of Potash becomes violet, then red and yellow. Extremely poisonous.

Recognition.—Strychnine can only be recognised by its general appearance. The student must make himself familiar with its appearance, and should carefully compare it with that of Salicylic Acid in

large crystals. The chemical test given above is most distinctive.

Prescribing.—Strychnine may be given in pills, using the same precautions in preparing them as described under Mercuric Chloride. It is perhaps best given in solution by means of the liquor.

Dose.— $\frac{1}{10}$ grain.

Preparation.—*Liquor Strychninæ Hydrochloratis*—Liquor Strychninæ, Solution of Hydrochlorate of Strychnine (Strychnine, Dilute Hydrochloric Acid, Rectified Spirit, Water—1 in 100). *Dose.*—10 minims.

The acid dissolves the Strychnine (by heat) and the spirit preserves the mixture.

Group XXI.—Belladonna and Allied Drugs.

*64. *Belladonnæ Radix* — Belladonna Root, 'Deadly Nightshade' Root.

Production.—The dried root of *Atropa Belladonna*.

Characters.—In pieces up to a foot long, and half an inch in diameter. Externally the root is covered with a rough and wrinkled light-brown skin; this can be easily scraped off. Internally it is white and fibrous in appearance. The root has no smell. Belladonna Root is often in pieces which have been split in two lengthwise; the central portion of the root then remains attached to one half as a prominent ridge, whilst the other half has a corresponding furrow. This appearance is characteristic of Belladonna Root.

Recognition.—The colour, light-brown outside and white inside, fibrous nature, and absence of smell, distinguish Belladonna. No other root resembles it closely. Beware of confounding it with Gentian Root.

Composition.—An important alkaloid, 'Atropine' (·5 per cent.); two less important bodies, 'Hyoscyamine' and 'Belladonnine.' A colouring matter, and Malic Acid. The student should remember that Belladonna, Hyoscyamus, and Stramonium contain alkaloids which are identical or isomeric with each other; hence the medicinal action of these three drugs is very similar, Belladonna being the most powerful.

Prescribing.—See *Belladonnæ Folia*.

Incompatibles.—Strong Alkalies, Astringent substances.

Preparations.—*Linimentum Belladonnæ*—Liniment of Belladonna (1 in 1½, S.V.R., with Camphor), Maceration and Percolation.

The smell of the Camphor marks this preparation as a liniment, and thus distinguishes it from tinctures of the same colour.

Extractum Belladonnæ Alcoholicum—Alcoholic Extract of Belladonna, 'Brown Extract of Belladonna' (an alcoholic extract). *Dose.*—¼ grain.

N.B.—Carefully distinguish this Brown Extract of Belladonna Root from green extract of the leaves. That from the root is by far the most powerful.

Emplastrum Belladonnæ—Plaster of Belladonna (Alcoholic Extract of Belladonna, Resin and Soap Plasters—1 in 5).

Unguentum Belladonnæ—Ointment of Belladonna (Alcoholic Extract of Belladonna and Benzoated Lard—1 in 10). These two preparations are of a brown colour. Green Plaster and Ointment of Belladonna, although not now in the 'British Pharmacopœia,' are very largely used.

Belladonnæ Folia—Belladonna Leaves, 'Deadly Nightshade' Leaves, 'Dwale.'

Production.—The fresh leaves and branches and the dried leaves of *Atropa Belladonna*.

Characters.—The leaves vary in size from 3 to 8 inches in length. They are of an elongated oval in shape, tapering at the apex to a point. Surface smooth, colour greenish-yellow, when dry the upper side darker than the under. The edge of the leaf is entire. There is no characteristic odour. The juice or infusion, applied to the eye, powerfully dilates the pupil.

Composition.—As that of the root, but less rich in alkaloids.

Prescribing.—Externally Belladonna may be ordered in the form of liniment, painted, or rubbed, or applied on lint. The plasters, both brown and green, are much used. The extracts, mixed with Glycerine or water, are used as applications to the breasts, etc., as is also the ointment. Internally Belladonna is given in pills of the extracts. The tincture and succus in mixtures. Suppositories of Belladonna are also used. Note that preparations of the root are much more powerful than those of the leaves.

Incompatibles.—See Root.

Preparations (of the leaves)—*Extractum Belladonnæ*—Extract of Belladonna (a green extract). *Dose*.—1 grain.

Succus Belladonnæ—Juice of Belladonna (see Sueci). *Dose*.—15 minims.

Tinctura Belladonnæ—Tincture of Belladonna (Dried Leaf, Proof Spirit, Maceration and Percolation—1 in 20). *Dose*.—20 minims.

Atropina—Atropine; $C_{17}H_{23}NO_3$. Atropia.

Production.—An alkaloid obtained from Belladonna Root. The root is exhausted with spirit, and the spirituous extract shaken with slaked lime. Atropine is thus set free. The mixture is filtered and dilute Sulphuric Acid added to the filtrate, the spirit is distilled and evaporated off, the alkaloid

again set free from its sulphate, with Carbonate of Potas., dissolved out with Chloroform, purified with Charcoal, and crystallized.

Characters. — Colourless crystals. But little soluble in water, freely so in alcohol. Decomposed by alkalies. Very poisonous.

Prescribing. — Very rarely used internally. Externally in ointment. The sulphate is alone to be used in solution for the eye, or by hypodermic injection.

Preparation. — *Unguentum Atropinæ* — Ointment of Atropine (Atropine, S.V.R., Benzoated Lard — 8 grains in 1 oz.).

The Atropine is dissolved in the spirit, and the solution mixed with the lard.

Atropinæ Sulphas — Sulphate of Atropine, Sulphate of Atropia.

Production. — By neutralizing Atropine with dilute Sulphuric Acid and evaporating to dryness.

Characters. — Nearly colourless crystals or a white powder. Soluble in water (1 in 4). Very poisonous. Powerfully dilates the pupil.

Prescribing. — Atropine sulphate is very largely used externally in solution as an application to the eye, or in the B.P. *Lamellæ* or 'Atropine Gelatine.' Internally it is given by the mouth (in solution) or by hypodermic injection.

Dose. — $\frac{1}{2}$ grain.

Incompatibles. — Alkalies, Tannic matter.

Preparations. — *Liquor Atropinæ Sulphatis* — Solution of Sulphate of Atropine (Sulphate of Atropine, Camphor Water — 1 in 100). *Dose.* — 4 minims.

For hypodermic injection this solution may be mixed with an equal volume of water; the dose of this mixture is then up to 5 minims.

Lamellæ Atropinæ — Disks of Atropine. Each one contains $\frac{1}{8000}$ grain of Sulphate of Atropine.

Homatropinæ Hydrobromas—Hydrobromate of Homatropine; $C_{17}H_{21}NO_3HB_2$.

Production.—By the action of certain reagents (such as Baryta Water), Atropine and Hyoscyamine can be decomposed into two bodies, 'Tropic Acid' and 'Tropine.' By combining the latter with Mandelic Acid, a salt, 'Mandelate of Tropine,' is formed, which on treatment with dilute acid forms an artificial alkaloid, 'Homatropine.' This is combined with Hydrobromic Acid to form Homatropine Hydrobromate.

Characters.—A white crystalline powder. Soluble in water (1 in 6), less so in alcohol.

Prescribing.—Homatropine is used as a substitute for Atropine Sulphate as an application to the eye; it acts quicker, and its effects are less persistent than those of Atropine. It is said to be much less poisonous. Internally in solution.

Dose.— $\frac{1}{20}$ grain.

Incompatibles.—Alkalies, Tannic matter.

Hyoscyami Folia—Hyoscyamus Leaves, 'Henbane' Leaves.

Production.—The fresh leaves, flowers, and branches, and the dried leaves of Hyoscyamus Niger.

Characters.—The leaves vary in length up to 8 inches; shape a triangular oval, the edge being toothed. Colour pale-green, the under-surface of the leaf has a hairy appearance; odour peculiar. The leaves have a peculiar damp and clammy feel, which is very characteristic. The flowers are yellow, veined with blue.

Composition.—'Hyoscyamine,' an alkaloid isomeric with and easily convertible into Atropine. 'Hyoscine,' an alkaloid (said to be liquid) isomeric with Hyoscyamine. Malic Acid, gum, sugar, and colouring matter.

Prescribing.—Hyoscyamus is largely ordered as the extract in pills as a corrective to the action of purgative drugs. Note the dose of the preparations, which are larger than those of Belladonna or Stramonium. The tincture and succus are given in mixtures. Alkalies, although said to be incompatible, are largely prescribed with preparations of Hyoscyamus. Not used externally.

Incompatibles.—Lead and Silver Salts, Caustic Alkalies(?), Vegetable Acids.

Preparations.—*Extractum Hyoscyami*—Extract of Hyoscyamus (a green extract). *Dose.*—10 grains.

Pilula Colocyntidis et Hyoscyami—1 in 3 (see Colocynth).

Succus Hyoscyami—Juice of Hyoscyamus (see Succi). *Dose.*—1 dram.

Tinctura Hyoscyami—Tincture of Hyoscyamus (Dried Leaves. Proof Spirit, Maceration and Percolation—1 in 8). *Dose.*—1 dram.

*65. **Stramonii Semina** — Stramonium Seeds, 'Thorn-apple' seeds.

Production.—The dried ripe seeds of *Datura Stramonium*.

Characters. — Brownish-black, kidney-shaped seeds, about one-sixth of an inch long. The surface is rough, pitted, and wrinkled. No odour.

Recognition.—Stramonium seeds are easily recognised by their kidney-shape, colour, and pitted appearance; no other seeds resemble them.

Composition.—'Daturine,' an alkaloid identical with Hyoscyamine. 'Stramonin,' an indefinite body, and about 25 per cent. of a fixed oil. Stramonium seeds, macerated in alcohol, yield a solution with a bright green fluorescence.

Prescribing.—In pills, by means of the extract, or the tincture in mixtures.

Incompatibles.—Mineral Acids, Metallic Salts, Caustic Alkalies.

Preparations.—*Extractum Stramonii*—Extract of Stramonium. The powdered seeds are washed with Ether in a percolator to remove the fixed oil; the washed drug is then treated with spirit, and an alcoholic extract made in the usual way. *Dose.*— $\frac{1}{2}$ grain.

Tinctura Stramonii—Tincture of Stramonium (Bruised seeds, Proof Spirit, Maceration, and Percolation—1 in 8). *Dose.*—30 minims.

Stramonii Folia—Stramonium Leaves, 'Thorn-apple' leaves.

Production.—The dried leaves of *Datura Stramonium*.

Characters.—About six inches long; shape oval, but the edges are deeply toothed, and the apex pointed. Surfaces smooth. Colour darkish-green, the upper darker than the under surface. Odour heavy and peculiar.

Composition.—As that of the seeds. The seeds are much the stronger.

Prescribing.—There are no preparations of Stramonium leaves. The dried leaves are made into cigarettes or a tobacco, and smoked for asthma, etc. Or the powdered leaves (mixed with Nitrate of Potassium, etc.) may be burnt, and the smoke inhaled. 'Datura Tatula' cigarettes are much used.

Group XXII.

*66. *Cannabis Indica*—Indian Hemp, *Cannabis Indica*, 'Hashish,' Gunjah.

Production.—The dried tops, in fruit or flower, of the female plants of *Cannabis Sativa*.

Characters.—*Cannabis Indica* is generally seen in the form of hollow stems, several inches long, and up to the diameter of a slate pencil in thickness; from these stems, short stalks proceed alter-

nately, each bearing a mass of small dark-green leaves, fruit, and flowers, closely pressed together. Some samples of the drug consist of these masses only, without the main stalk. It is rough and brittle to the touch. The odour is faint, but peculiar and characteristic.

Recognition.—The general appearance of the drug is most characteristic, and easily identifies Indian hemp. The smell, which is very noticeable in the extract, is quite peculiar, and unlike that of any other drug.

Composition.—A resin known as 'Cannabin,' amorphous; a volatile oil, 'Cannabene'; and a volatile alkaloid, 'Cannabinine,' are the chief active principles. There is still considerable doubt as to what body this drug owes its activity to.

Prescribing.—Not used externally. Internally, in pills by the extract, and in mixture by the tincture. The latter preparation precipitates with water, and must be dispensed with Tragacanth or Acacia mucilage (see Tinct. Asafœtida).

Preparations.—*Extractum Cannabis Indicæ*—Extract of Indian hemp (an alcoholic extract). *Dose.*—1 grain.

Tinctura Cannabis Indicæ—Tincture of Indian hemp (Extract, Rectified Spirit—1 in 20; dissolve). *Dose.*—20 minims. Dispense with mucilage (see above).

Group XXIII.—Digitalis and Allied Drugs.

*67. **Digitalis Folia**—Digitalis leaves, 'Foxglove' leaves.

Production.—The dried leaves of Digitalis Purpurea.

Characters.—Shape, a more or less elongated, tapering oval. The margin of the leaf extends

some way down each side of the stalk. The edge of the leaf is finely toothed, the upper surface slightly hairy and of a dull green colour, lower surface paler and downy. The veins on the lower surface are very conspicuous, and form a prominent white network. Odour faint, but peculiar.

Recognition.—The finely toothed margin, and especially the conspicuous white network on the lower surface of the leaf, distinguish *Digitalis*. This latter characteristic is peculiar to the drug, and will distinguish it from other leaves. Compare the leaves with the others to be recognised—*Coca*, *Jaborandi*, and *Senna*.

Composition.—Four glucosides. 1, 'Digitalin'; 2, 'Digitonin'; 3, 'Digitalein'; 4, 'Digitoxin.' It is not at all certain which of these represents the chief active principle of *Digitalis*.

Prescribing.—*Digitalis* leaf may be given (in powder) in pills, but the infusion and tincture, the latter especially, are chiefly used. Note the dose of Infusion of *Digitalis*.

Dose (of the powdered leaf)— $1\frac{1}{2}$ grains.

Incompatibles.—Ferrie Salts (but these are very largely prescribed with it), Lead Salts, Preparations of *Cinchona*.

Preparations.—*Infusum Digitalis*—Infusion of Foxglove (Dried leaf, Boiling water, 15 minutes—56 grains in 1 pint). *Dose.*—4 drams.

N.B.—Carefully notice the dose of this preparation, the dose of most infusions is 2 ounces.

Tinctura Digitalis—Tincture of Foxglove (Dried leaf, Proof Spirit, Maceration, and Percolation—1 in 8). *Dose.*—30 minims.

Strophanthus—*Strophanthus*.

Production.—The mature seeds of *Strophanthus Hispidus*.

Characters.—Long narrow seeds, about three-fifths

of an inch long, and a sixth broad, tapering at one extremity to a sharp point. When the seed is entire, from this point proceeds a slender stalk, about an inch long, surrounded by long white silky hairs. The seed itself is covered with close fine silky hairs; colour a yellowish-brown. No particular odour.

Composition.—A glucoside 'Strophanthin,' crystalline, soluble in water, allied in action to Digitalin. A crystalline principle, 'Inein,' of which little is known, is also present, and a fixed oil.

Prescribing.—In mixture, by means of the tincture.

Preparation.—*Tinctura Strophanthi*—Tincture of Strophanthus. Strophanthus seeds are dried and powdered, packed in a percolator, and washed with Ether (to remove the fixed oil); the powdered seeds again dried, and macerated and percolated with Rectified Spirit (1 in 20). *Dose.*—10 minims.

*68. *Scilla*—Squill.

Production.—The sliced and dried bulb of *Urginea Scilla*.

Characters.—The Squill bulb is a large pear-shaped bulb, weighing from $\frac{1}{2}$ to 4 pounds, but in pharmacy the sliced bulb is always used. It has the following characters: flat slices, more or less curved, about 1 inch long, and up to $\frac{1}{4}$ inch broad; colour light yellow; the pieces are tough, leathery, or, if very dry, brittle. Translucent. No particular odour.

Recognition.—The peculiar appearance easily distinguishes Squill. Note the translucent nature and the tough and leathery consistence. No other drug resembles it. Occasionally sliced Squill has a pinkish tinge.

Composition.—A glucoside 'Scillain' or 'Scillitin,' amorphous, highly poisonous. Said to consist of

three bodies; 'Scillitoxin,' 'Scillipicrin,' and 'Scillin.' A non-volatile acrid principle, 'Skulein,' and a large quantity of albumen and mucilage.

Prescribing.—Squill in powder is largely used in pills. In mixtures the tincture, syrup, and oxymel are much used. Squill is closely allied to *Digitalis* in its action, and hence its use requires caution.

Dose (in powder).—3 grains.

Preparations.—*Acetum Scillæ*—Vinegar of Squill (Squill, dilute Acetic Acid, Maceration—1 in 8).

Dose.—40 minims.

Oxymel Scillæ—Oxymel of Squills (Vinegar of Squill, Honey, mixed by heat—5 to 8). *Dose.*—1 dram.

Syrupus Scillæ—Syrup of Squill (Vinegar of Squill 1 pint, Sugar 2½ lb.; dissolve). *Dose.*—1 dram.

Pilula Scillæ Composita—Compound Pill of Squill (Squill in powder, Ginger, Ammoniacum, Hard Soap, Treacle—1 in 5). *Dose.*—10 grains.

Pilula Ipecac. cum Scilla—see *Ipecac.* (1 in 7).

Tinctura Scillæ—Tincture of Squill (Squill, Proof Spirit, Maceration and Percolation—1 in 8). *Dose.*—30 minims.

Group XXIV.—Castor Oil and other Purgatives.

Oleum Ricini—Castor Oil.

Production.—A fixed oil expressed from the seeds of *Ricinus Communis*.

Characters.—A thick viscid oil, colourless or slightly yellow. Odour faint, but most persistent and disagreeable. Taste unpleasant and acrid. Soluble in Rectified Spirit (1 in 2). Forms a jelly when rubbed with Glycerine.

Composition.—Chiefly consists of 'Ricinoleate of Glyceryl' and the glycerides of other fatty acids; no other purgative principle has been found in it.

Prescribing.—Owing to its viscid, sticky nature, Castor Oil is sometimes useful as an external application, *e.g.*, in burns and injury to the eye with Quicklime. Internally, Castor Oil may be given in various ways. Its taste is disgusting, and should be disguised as much as possible. The oil may be floated on the surface of an ounce of peppermint or plain water, and the mixture quickly swallowed; or it may be made into an emulsion with yolk of egg or acacia, and flavoured with peppermint or other agent, or it may be given in small doses in capsules. The jelly it forms with Glycerine is sometimes useful, as is also the solution in extract of malt. The B.P. mixture is particularly nasty. Castor Oil is sometimes given as an enema.

Dose.—8 drams.

Preparations.—*Mistura Olei Ricini*—Castor Oil Mixture (Castor Oil, Oil of Lemon, Oil of Cloves, Syrup, Solution of Potash, Orange-flower Water—6 drams in 2 oz.). *Dose.*—2 oz.

Castor Oil is also used in Collodium Flexile, Lin. Sinapis Comp., Pil. Hydrarg. Subchlor. Comp.

Oleum Crotonis—Croton Oil.

Production.—A fixed oil expressed from the seeds of Croton Tiglium.

Characters.—A brownish-yellow, more or less viscid fixed oil. Fluorescent. Odour faint, but disagreeable and rancid. Taste burning and acrid. The oil is highly poisonous. Soluble in alcohol.

Composition.—Besides the ordinary glycerides of fatty acids present in most fixed oils, Croton Oil contains two highly active bodies, one of which is a blistering agent, the other a purgative. Little is known of their chemical nature.

Prescribing.—Externally, a few drops may be gently rubbed into the skin with the tip of the finger, or by other means. It acts violently, pro-

ducing pustules, and requires care. The Lini-
mentum Crotonis is a safer and less violent
counter-irritant. Internally, Croton Oil may be
given in pills made with a little soap and powdered
liquorice, or a dose may be placed upon a lump of
sugar and the sugar quickly swallowed, or the oil
placed upon the tongue. It acts very quickly, and
requires caution.

Dose.—1 minim. (Carefully note the dose.)

Preparation.—*Linimentum Crotonis*—Liniment of
Croton Oil (Croton Oil, Oil of Cajeput, Rectified
Spirit—1 in 8).

*69. **Aloe Barbadosis**—Barbadoes Aloes, Curaçoa
Aloes.

Production.—The inspissated (dried) juice from
the leaves of Aloe Vulgaris.

Characters.—In large, dark reddish-brown or
almost black fragments, which are dull or smooth
and glossy in appearance. The odour is strong,
peculiar, and disagreeable. Taste bitter. In
powder the drug is of a dark brown (or olive-green,
if old) colour, the odour being very marked. Aloes is
almost entirely soluble in spirit and water.

Recognition.—The general appearance, colour and
smell distinguish Aloes. The smell, which becomes
more noticeable when the drug is breathed upon, is
most peculiar, disagreeable, and characteristic. The
student must carefully compare the odour with
that of Socotrine Aloes. Do not confound this drug
with Guaiacum Resin, which has a green tint and
a totally different smell.

Composition.—Essential oils, resins, and a crys-
talline substance called ' Barb. Aloin ' (see Aloin).

Prescribing (see under Socotrine Aloes).

Dose.—6 grains.

Preparations.—*Enema Aloes* (Aloes, Carbonate of
Potassium, Mucilage of Starch—40 grains in
10 oz.).

Carbonate of Potash is used in several preparations of Aloes to saponify the resin present, and thus form a more efficient solution.

Extractum Aloes Barbadosis—Extract of Barbadoes Aloes (a dry Aqueous extract). *Dose*.—6 grains.

Note that this preparation has the same dose as Aloes itself. It is simply Aloes deprived of its resin.

Pilula Aloes Barbadosis—Pill of Barbadoes Aloes (Barbadoes Aloes, Hard Soap, Oil of Caraway, Confection of Roses—1 in 2). *Dose*.—10 grains.

Pilula Aloes et Ferri—Pill of Aloes and Iron (Sulphate of Iron, Barbadoes Aloes, Compound Powder of Cinnamon, Confection of Roses—1 in 7 Iron, 1 in $5\frac{1}{4}$ Aloes). *Dose*.—10 grains.

Barbadoes Aloes is also contained in Pil. Cambog. Co. (1 in 6), in Pil. Coloc. Co.—q.v.—(1 in 3), and Pil. Coloc. et Hyoscy. (1 in $4\frac{1}{2}$).

*70. **Aloe Socotrina**—Socotrine Aloes, 'Hepatic Aloes,' Zanzibar Aloes.

Production.—The inspissated juice of the leaves of Aloe Perryi and other species.

Characters.—In large fragments. Colour various shades of reddish-brown, or it is sometimes liver-coloured (hepatic). Thin films are transparent and red, or orange-brown, but this Aloes is sometimes quite Opaque. The odour is fruity and agreeable, especially marked in the powder, which is of a reddish-brown colour. Taste bitter. Soluble in spirit and water.

Recognition.—The general appearance distinguishes this drug as an aloes. Compare it with Barbadoes Aloes, and note that the odour of Barbadoes Aloes is strong and very disagreeable, that of Socotrine Aloes fruity and agreeable. Barbadoes Aloes is usually darker in colour than Socotrine Aloes. The two drugs in powder are quite different

in colour, and the difference between the odours is then very marked.

Composition.—As that of Barbadoes Aloes. The Aloin is called ' Socaloin.'

Prescribing.—There is little to choose between the two aloes as medicines; the Socotrine is perhaps the most used. Aloes is not used externally. Internally in pills. A little Compound Tincture of Cardamoms forms a ready excipient. Aloes enters into the composition of nearly all the aperient pills of the ' Pharmacopœia.' It acts very slowly. Aloes may also be given in Enema or in mixtures by the Compound Decoction or Tincture. Note that the liquid preparations, except the enema, are all made from Socotrine Aloes.

Dose.—6 grains.

Preparations.—*Decoetum Aloes Compositum*—Compound Decoction of Aloes (Extract of Socotrine Aloes, Myrrh, Saffron, Carbonate of Potassium, Extract of Liquorice, Compound Tincture of Cardamoms, Water—4 grains ext. in 1 oz.). *Dose.*—2 oz.

The liquorice is used to disguise the taste of the aloes.

Enema Aloes—Enema Aloes (Aloes, Carbonate of Potassium, Mucilage of Starch—40 grains in 10 oz.).

Note that this preparation may be made with either of the Aloes.

Extractum Aloes Socotrinæ—Extract of Socotrine Aloes (a dry Aqueous extract). *Dose.*—6 grains.

See note under Ext. Aloes Barb.

Pilula Aloes et Asafœtidæ—Pill of Aloes and Asafœtida (Socotrine Aloes, Asafœtida, Hard Soap, Confection of Roses—1 Aloes in 4, 1 Asaf. in 4). *Dose.*—10 grains.

Pilula Aloes et Myrrhæ—Pill of Aloes and Myrrh, ' Pil. Rufi ' (Socotrine Aloes, Myrrh, Saffron,

Treacle, Glycerine—1 Aloes in 3, 1 Myrrh in 6).
Dose.—10 grains.

Pilula Aloes Socotrinæ—Pill of Socotrine Aloes (Socotrine Aloes, Hard Soap, Oil of Nutmeg, Confection of Roses—1 in 2). *Dose.*—10 grains.

Tinctura Aloes—Tincture of Aloes (Socotrine Aloes, Extract Liquorice, Proof Spirit, Maceration—1 in 40). *Dose.*—2 drams.

Vinum Aloes—Wine of Aloes (Socotrine Aloes, Cardamoms, Ginger, Sherry— $\frac{3}{4}$ oz. in 1 pint).
Dose.—2 drams.

Socotrine Aloes is also contained in Ext. Colocynth Comp. (1 in $2\frac{1}{4}$)—q.v.; Pil. Rhei Co. (1 in 6); Tinctura Benzoini Co. (8 grains in 1 oz.).

*71. **Aloin**—Aloin; $C_{16}H_{18}O_7$.

Production.—Obtained from either variety of Aloes by treatment with acidulated water or alcohol, and purified by recrystallization. Aloin obtained from Barbadoes Aloes is called 'Barbaloin,' that from Socotrine Aloes 'Socaloin'; the former is the one chiefly used. The medicinal action of the two is similar.

Characters.—A dull, brownish-yellow powder, possessing no smell, but having the peculiar nauseous bitter taste of Aloes. Slightly soluble in water (1 in 60), freely so in rectified spirit.

Recognition.—Note the peculiar brownish-yellow colour and the absence of smell. Compare this powder with the other yellow powders to be recognised, Sublimed Sulphur, Yellow Oxide of Mercury, and Powdered Rhubarb, all of which are much brighter in colour, the last having a peculiar smell.

Composition.—Aloin is a complex phenol, and is allied to Anthracene.

Prescribing.—Aloin is largely ordered in pills, with such drugs as Nux Vomica, etc. It is occa-

sionally used by hypodermic injection, a warm aqueous solution being employed.

Dose.—2 grains.

Rhamni Purshiani Cortex—Sacred Bark, 'Cascara Sagrada.'

Production.—The dried bark of *Rhamnus Purshianus*.

Characters.—In incurved pieces, of varying sizes, nearly smooth externally, and more or less completely covered with a grayish-white layer. The inside of the bark has a velvety appearance, and is of a dark chocolate-brown; the edges of the bark are a cinnamon-brown. There is no marked odour, and the taste is bitter.

Composition.—The bark contains three resins, brown, yellow, and red; a neutral crystalline principle; tannic, malic, and oxalic acids; and a little volatile oil. The purgative principle is considered by some authorities to be allied to that contained in Rhubarb root.

Prescribing.—This drug is almost invariably prescribed and sold under the name of 'Cascara Sagrada.' Pills of the extract may be ordered. In mixtures the liquid extract. This preparation precipitates with water, but if a little Aromatic Spirit of Ammonia be mixed with the water first, a clear mixture is formed. The taste of the drug is very nauseous, and a little spirit of chloroform, syrup, or other flavouring agent should be ordered with it.

Preparations.—*Extractum Cascaræ Sagradæ*—Extract of Cascara Sagrada (an Alcoholic and Aqueous extract). *Dose.*—8 grains.

Extractum Cascaræ Sagradæ Liquidum—Liquid Extract of Cascara Sagrada (an Aqueous extract—1 = 1). *Dose.*—2 drams.

*72. **Colocynthis Pulpa**—Colocynth Pulp, 'Bitter Apple.'

Production.—The dried and peeled fruit, without the seeds, of *Citrullus Colocynthis*.

Characters.—In light white spongy balls, about the size of a small orange, or in fragments of these balls. These balls consist of the pulp of the fruit, with the seeds imbedded therein. The broken pulp, freed from the seeds, is alone to be used in medicine. The pulp is spongy, porous, and easily torn; it has no odour, and a very bitter taste.

Recognition.—When entire, the appearance of Colocynth apples is most characteristic, and they are easily recognised; they are occasionally seen unpeeled, covered with a thin, smooth, yellowish-brown rind. In fragments, the spongy, porous, tearable nature of the pieces distinguish Colocynth. The seeds, which are often present, are small, egg-shaped, and a light greenish-yellow colour; they contain much oil.

Composition.—A bitter glucoside, 'Colocynthin' (.25 per cent.), mucilage and gummy matter (no starch or fixed oil should be present), 'Citrullin,' a resinous body.

Prescribing.—Colocynth is very rarely prescribed alone; it is generally ordered in pills, with other purgatives, or with a sedative, such as Extract of Hyoscyamus. It is sometimes used in powder as an insecticide.

Dose.—8 grains.

Preparations.—*Extractum Colocynthidis Compositum*—Compound Extract of Colocynth (Colocynth, Ext. Socot. Aloes, Scammony Resin, Curd Soap, Cardamoms, Proof Spirit—1 in 5½).

The Colocynth is macerated in the spirit for four days, the spirit distilled off, the other drugs added, and the whole evaporated to a hard extract. *Dose.*—10 grains.

Pilula Colocynthidis Composita—Compound Pill

of Colocynth (Colocynth, Barb. Aloes, Scammony Resin, Sulphate of Potash, Oil of Cloves, Water; mix—1 in 6). *Dose*.—10 grains.

Pil. Coloc. et Hyoscyami—Pill of Colocynth and Hyoscyamus (Pil. Coloc. Co., 2; Extract Hyoscyamus, 1). *Dose*.—10 grains.

*73. **Elaterium**—Elaterium, Extractum Elaterii.

Production.—The sediment from the juice of the fruit of Ecballium Elaterium, 'The Squirting Cucumber.' The fruit is cut in pieces, the juice lightly pressed out and strained. On allowing the juice to stand some time, the Elaterium deposits. It is filtered off (through linen), and dried in a warm place.

Characters.—In small flat, or slightly curved oblong cakes, or fragments of cakes, about $\frac{1}{10}$ inch thick. Colour buff, or sometimes greenish-yellow. No particular odour. The fragments are friable, and easily crumble; they are often marked on the convex side with the impression of a cloth. Taste bitter and acrid. The drug has a very powerful action.

Recognition.—No drug at all resembles Elaterium, so that its general appearance easily identifies it.

Composition.—A powerful principle, 'Elaterin' (20 to 30 per cent.), 'Ecballin,' or Elateric Acid, acrid and resinous, 'Prophetin,' a glucoside, and gummy matter.

Prescribing.—In pills. The active principle, 'Elaterin,' is far more certain in its action, and is preferable to Elaterium.

Dose.— $\frac{1}{2}$ grain.

Elaterinum—Elaterin, 'Momordicin'; $C_{20}H_{28}O_5$.

Production.—The active principle of Elaterium. Elaterium is exhausted with Chloroform, and to the Chloroform solution Ether is added; this

precipitates the Elaterin, which is collected, washed with Ether, and recrystallized from Chloroform.

Characters.—Small colourless crystals. Insoluble in water; slightly soluble in spirit; no odour; taste bitter.

Prescribing.—Elaterin is best given in pills, by means of the compound powder, or this preparation itself may be given in powders. Be careful not to confound Elaterin with Elaterium.

Dose.— $\frac{1}{10}$ grain.

Preparations.—*Pulvis Elaterini Compositus*—Compound Powder of Elaterin (Elaterin, Sugar of Milk—1 in 40). *Dose.*—5 grains.

**Jalap*—Jalap.

Production.—The dried tubercles (enlarged roots) of *Ipomœa Purga*.

Characters.—Jalap tubercles occur in various shapes and sizes, oblong, egg-shaped, turnip-shaped, and sometimes in an elongated form, tapering at each end. The tubercles vary in size from half an inch in diameter, at the thickest part, up to 2 or 3 inches, and are up to 4 or 5 inches long. Externally they are dark-brown, irregularly and deeply furrowed and wrinkled; internally, a brownish yellow. There is no marked odour to the drug, unless in powder.

Recognition.—The appearance of Jalap is most characteristic, and easily enables it to be identified. In powder, the drug has a peculiar smoky, burnt odour, and a yellowish-gray colour. The odour is characteristic, and should be carefully noticed.

Composition.—Jalap contains from 10 to 20 per cent. of Resin, also Gum, Sugar, and Starchy matters.

Prescribing.—Jalap may be given in pills by means of the extract, but is best ordered in

powder, with a carminative (*e.g.*, as Pulv. Jalapæ Comp.). The tincture in mixtures is but little used.

Dose (in powder).—30 grains.

Preparations.—*Extractum Jalapæ*—Extract of Jalap (an Alcoholic and Aqueous extract). *Dose*.—15 grains.

Pulvis Jalapæ Compositus—Compound Powder of Jalap (Jalap, Acid Tartrate of Potassium, Ginger—1 in 3). *Dose*.—1 dram.

Tinctura Jalapæ—Tincture of Jalap (Jalap, Proof Spirit, Maceration, and Percolation—1 in 8). *Dose*.—2 drams. Jalap is also contained in Pulv. Scammon. Co.

Resina Jalapæ—Jalap Resin.

Production.—A Resin prepared from Jalap. A tincture of Jalap is made with Rectified Spirit, by maceration and percolation. Water is added to this tincture, which precipitates the resin, the spirit is distilled off, and the resin collected and dried.

Characters.—In dark-brown fragments, translucent and brittle. Odour peculiar, cheese-like; taste acrid. Insoluble in water, soluble in spirit.

Composition.—Jalap Resin consists of two bodies, one soluble in Ether, 'Jalapin,' and one insoluble in Ether, 'Convulvin'; the latter is the chief constituent, amounting to 90 per cent.

Prescribing.—Jalap Resin is given in pills. A purified and powdered form of the resin is used under the name of 'Jalapin'; this is a light-yellow powder, with the peculiar smell of Jalap Resin.

Dose.—5 grains.

Used in Pil. Scammonii Comp.

Podophylli Rhizoma—Podophyllum Rhizome, Podophylli Radix, 'May-apple,' 'Mandrake.'

Production.—The dried Rhizome (underground stem) of *Podophyllum Peltatum*.

Characters.—In pieces of various length, and up to one-third of an inch thick. The pieces are of a more or less flattened oval shape. Colour, a dark reddish brown, knotty, and marked, especially at the knots, with numerous circular white scars, where the rootlets have been broken off. Brittle, the fractured surface white, with a single ring. No particular odour. Taste bitter.

Composition.—The drug owes its activity to a resinous body called 'Podophyllin' (see below).

Prescribing.—There are no preparations of the Rhizome besides the resin, and it is not used except to prepare this drug.

Podophylli Resina — Resin of *Podophyllum*, 'Podophyllin.'

Production.—*Podophyllum* Rhizome is exhausted by percolation with Spirit; the spirit is distilled off, and the concentrated tincture poured into three times its volume of water. The separated resin is collected, washed, and dried.

Characters.—A brownish-yellow powder with a peculiar resinous smell. Insoluble in water, soluble in spirit.

Composition.—The resin contains 'Podophyllic Acid,' insoluble in Ether; 'Podophyllotoxine' and 'Podophylloquercetin,' soluble in Ether. The portion soluble in Ether is alone active.

Prescribing.—Podophyllin is usually ordered in pills, with other purgative or alterative drugs. The tincture precipitates with water, and should be dispensed with mucilage.

Dose.—1 grain.

Preparation.—*Tinctura Podophylli*, Tincture of *Podophyllum* (Podophyllin Resin, Rectified Spirit—1 grain in 1 dram). *Dose.*—1 dram.

*75. *Rhei Radix*—Rhubarb Root, 'Turkey Rhubarb.'

Production.—The sliced and dried root, deprived of its Bark, of *Rheum Palmatum*, *Officinale*, and other species. From China and Thibet.

Characters.—Rhubarb Root occurs in pieces of nearly all sizes and shapes, cylindrical, angular, barrel-shaped, etc. Pieces of the best quality are often small and angular, each piece covered with the orange-yellow powdered drug, and having a small hole running through near the middle. Externally the drug is marked with fine dark-red lines, intermixed with the yellowish-brown substance of the root. The root is hard and compact, and when broken or cut presents a peculiar marbled red and white appearance. The odour is most peculiar, taste slightly bitter, astringent and gritty.

Recognition.—The very characteristic odour, red veined or marbled appearance, and the orange-yellow colour at once distinguish Rhubarb Root. Compare the colour of the powdered root with that of Yellow Oxide of Mercury, and note the difference in weight and odour.

Composition.—Rhubarb Root contains an important purgative principle, 'Cathartic Acid' (also present in Senna—3 to 4 per cent.); a variety of tannic acid, 'Rheotannic Acid'; a yellow colouring matter, 'Chrysophan'; and about 35 per cent. of Oxalate of Calcium in the form of 'Raphides.' This combination of a purgative with an astringent principle is unusual. It should be remembered as explaining the medicinal action of Rhubarb.

Prescribing.—Powdered Rhubarb is sometimes used externally in the form of ointment. Internally in powder or pills. In mixtures, by means of the tincture and syrup. A carminative is always combined with it.

Dose (as a stomachic).—5 grains; (as a purgative) 20 grains.

Preparations.—*Extractum Rhei*—Extract of Rhubarb (an Alcoholic and Aqueous extract). *Dose.*—15 grains.

Infusum Rhei—Infusion of Rhubarb (Rhubarb, Water; half an hour— $\frac{1}{2}$ oz. in 1 pint). *Dose.*—2 oz.

Pilula Rhei Composita—Compound Pill of Rhubarb (Rhubarb, Aloes Soc., Myrrh, Soap, Oil of Peppermint, Glycerine, Treacle—1 in 4). *Dose.*—10 grains.

Pulvis Rhei Compositus—Compound Powder of Rhubarb, 'Gregory's Powder' (Rhubarb, Heavy or Light Magnesia, Ginger—1 in $4\frac{1}{2}$). *Dose.*—1 dram.

Syrupus Rhei—Syrup of Rhubarb (Rhubarb Root and Coriander fruit in powder are treated by percolation with spirit and water; the liquid is evaporated, and sugar dissolved in the concentrated liquid). *Dose.*—4 drams.

Tinctura Rhei—Tincture of Rhubarb (Rhubarb, Cardamoms, Coriander, Saffron, Proof Spirit—2 oz. in the pint; maceration and percolation). *Dose.*—2 drams or 8 drams.

Vinum Rhei—Wine of Rhubarb (Rhubarb, Cinnamon, Sherry, maceration— $1\frac{1}{2}$ oz. in 1 pint). *Dose.*—2 drams.

*76. *Senna Alexandrina*—Alexandrian Senna.

Note.—There are two varieties of Senna used in Pharmacy, Alexandrian and Indian. Either of these may be used to make medicinal preparations of Senna. Their composition and medicinal action are practically identical; they differ slightly in their characters.

Production.—The dried leaflets of *Cassia Acutifolia*, imported from Alexandria.

Characters.—Narrow, pointed leaves, about an inch long and a quarter to half an inch broad

at their widest part. They are generally much broken. A few oblong leaves about half an inch broad are occasionally mixed with them. The leaves are a pale yellowish-green colour, and possess a faint tea-like odour. Taste nauseous and gummy.

Recognition.—The general appearance, colour, shape, and size distinguish Senna. On looking at a leaf, it will be seen that the blade of the leaf extends further down one side of the mid-rib towards the base than it does down the other. This feature of the leaf ('unequal at the base') is very characteristic of Senna, and distinguishes it from leaves of similar appearance.

*77. **Senna Indica**—East Indian Senna, Tinnivelly Senna.

Production.—The dried leaflets of *Cassia Angustifolia* from Southern India.

Characters.—The leaves are up to 2 inches in length and unbroken, and are all the same shape. The colour is more uniform, and a little darker than that of Alexandrian Senna; other characters the same.

Recognition.—Compare the Alexandrian with the Indian Senna, and note that the latter is much larger, not broken, and more uniform in size and colour. Both are unequal at the base.

Composition.—Both Sennas contain a purgative principle, 'Cathartic Acid,' soluble in water and proof spirit, but not in stronger alcohol; it is of a glucosidal nature. A yellow colouring matter, 'Chrysophan,' and resinous bodies, 'Sennacrol' and 'Sennapicrin.'

Prescribing.—Senna may be given in powder; the Compound Liquorice powder is an elegant form. Confection of Senna is also an agreeable vehicle for exhibiting Senna. The Infusion, Syrup,

and Compound Mixture are much used; the Tincture is a doubtful preparation. Senna, like Rhubarb, is always combined with a carminative. Liquorice entirely covers the nauseous taste.

Dose (in powder).—30 grains.

Preparations.—*Confectio Sennæ*—Confection of Senna (Senna, Coriander Fruit, Figs, Tamarinds, Cassia Pulp, Prunes, Extract of Liquorice, Refined Sugar, Water). The Prunes and Figs are boiled in water, the Tamarinds and Cassia Pulp added, the whole digested, and the pulpy mass rubbed through a sieve. To this semi-solid matter the Sugar, Extract of Liquorice, Coriander, and Senna are added, and the whole well mixed. The resulting compound is a black paste, with a fragrant smell and agreeable taste. *Dose.*—2 drams.

Infusum Sennæ—Infusion of Senna (Senna, Ginger, Boiling Water; half an hour—2 oz. to 1 pint). *Dose.*—2 oz.

Pulvis Glycyrrhizæ Compositus—Compound Powder of Liquorice (Senna, Liquorice Root, Fennel, Sulphur, Sugar—1 in 6).—*Dose.*—60 grains.

Mistura Sennæ Composita—Compound Mixture of Senna, 'Black Draught,' Haustus Niger (Sulphate of Magnesia, Liquid Extract of Liquorice, Tincture of Senna, Compound Tincture of Cardamoms, Infusion of Senna—1 in 5, Epsom Salts). *Dose.*—1½ oz.

Tinctura Sennæ—Tincture of Senna (Senna, Raisins, Caraway, Coriander, Proof Spirit, Maceration and Percolation—1 in 8). *Dose.*—4 drams.

Group XXV.—Camphor and Turpentine.

*78. *Camphora*—Camphor.

Production.—A stearoptene (solid volatile oil) prepared from the wood of *Cinnamomum Cam-*

phora. The wood is distilled with water, the Camphor is carried over with the steam, collected and resublimed.

Characters.—A colourless, translucent, crystalline solid. It may be in irregular fragments, in cakes, or large rings. Odour very powerful, peculiar, and penetrating. Soluble in rectified spirit, chloroform, ether, and fixed oils, slightly so in water. It can be easily powdered if moistened with a little spirit. It forms a fluid, oily compound when rubbed with Carbolic Acid, Chloral Hydrate, Thymol, etc. It is inflammable.

Recognition.—Camphor is at once recognised by its appearance and very characteristic smell. Finely-powdered Camphor, called 'Flowers of Camphor,' is now largely used.

Composition.—It is an oxidized volatile oil, and has the empirical formula, $C_{10}H_{16}O$. It is thus closely allied to Turpentine and the essential oils.

Prescribing.—Externally Camphor is used in most liniments. It is an antiseptic, and is used to preserve some of the liquors of the B.P. The compound with Chloral Hydrate is Anodyne. Internally Camphor may be given in pills, made with a little Soap and Proof Spirit, or Spirit of Camphor may be used dropped upon Sugar. Aqua Camphoræ is much used as a vehicle.

Dose.—10 grains.

Note.—This is a large dose, and Camphor is rarely given in doses larger than 5 grains.

Preparations. — *Aqua Camphoræ* — Camphor Water, 'Mistura Camphoræ' (Camphor $\frac{1}{2}$ oz., Distilled Water 1 gallon).

The Camphor should be attached to a piece of glass, and sunk to the bottom of the vessel, and the mixture macerated for 2 days before use. It contains about $\frac{1}{2}$ grain in 1 oz., but varies in

strength according to the temperature of the water and other circumstances. *Dose*.—2 oz.

Linimentum Camphoræ — Camphor Liniment, Camphorated Oil (Camphor, Olive Oil; dissolve —1 to 4).

Linimentum Camphoræ Compositum—Compound Camphor Liniment (Camphor, Oil of Lavender, strong Ammonia, S.V.R.—1 in 8).

Spiritus Camphoræ—Spirit of Camphor (Camphor, Rectified Spirit—1 to 9). *Dose*.—30 minims.

This preparation if prescribed in mixture must be dispensed with mucilage. (See *Tinct. Asafœtidæ*.)

Tinctura Camphoræ Composita—Compound Tincture of Camphor, 'Paregoric,' 'Paregoric Elixir' (Opium, Benzoic Acid, Camphor, Oil of Aniseed, Proof Spirit— $\frac{1}{4}$ grain Opium, $\frac{3}{16}$ Camphor in 1 dram). *Dose*.—1 dram.

Camphor is contained in all the liniments (except Ammonia, Calcis, Crotonis, Opii and Potas. Iodid.), and in Unguent. Hydrarg. Comp.

*79. *Oleum Terebinthinæ* — Oil of Turpentine; Turpentine, 'Spirits of Turpentine.'

Production.—The essential oil distilled from the oleo-resin (crude turpentine) of *Pinus Australis*, *Tæda*, and *Pinaster*.

Characters.—A colourless liquid, mobile, and with a powerful penetrating odour. Very inflammable. Dissolves essential and fixed oils, fat, wax and resins.

Recognition.—Turpentine is easily recognised by its peculiar odour and colourless nature.

Composition.—Turpentine consists of a neutral hydrocarbon 'Terebinthene,' $C_{10}H_{16}$. Nearly all the essential oils consist mainly of a hydrocarbon of this empirical formula, and on keeping, many of them spontaneously change into a body resembling turpentine.

Prescribing.—Turpentine is powerfully antiseptic and disinfectant, and destructive to insect life. Externally, it is used in liniment, or applied on flannel or lint ('Turpentine Stupes'). Internally, in mixture, with a suspending agent, or by the confection, 'Terebine,' prepared by the distillation of turpentine with Sulphuric Acid, is much used in mixture, and by inhalation. Turpentine is also given by enema.

Dose.—10 minims to 4 drams.

Preparations.—*Confectio Terebinthinæ* — Confection of Turpentine (Turpentine, Liquorice Root in powder, Honey—1 in 4). *Dose.*—2 drams.

Enema Terebinthinæ — Enema of Turpentine (Turpentine, Mucilage of Starch—1 oz. in 15 oz. = 1 enema).

Linimentum Terebinthinæ — Liniment of Turpentine (Soft Soap, Water, Camphor, Oil of Turpentine—2 in 21).

Linimentum Terebinthinæ Aceticum—Acetic Turpentine Liniment (Turpentine, Glacial Acetic Acid, Liniment of Camphor—4 Turpentine and 1 Acid in 9).

Unguentum Terebinthinæ — Ointment of Turpentine (Turpentine, Resin, Yellow Wax, Prepared Lard—8 in 17).

Resina—Resin, 'Rosin.'

Production.—The solid residue from the distillation of Turpentine. The Oleo-Resin of Turpentine ('Crude Turpentine,' 'Venice Turpentine') is distilled, Oil of Turpentine passes over, and Resin is left behind.

Characters.—In irregular, angular, or rounded fragments, which are deep yellow, opaque (from the presence of water), or clear and translucent. The colour varying from a pale yellow to a deep red. Odour not marked, unless warmed, then turpentine-like. Soluble in turpentine and alkalies.

Composition.—Resin consists chiefly of an organic acid, 'Abietic Acid.' This can be converted into a soluble salt by alkalies, 'Resin Soap.' Hence Resin is much used in soap-making.

Prescribing.—Not often used internally, when so, in pills. Externally, in ointments and plasters. 'Resin Soap' is a useful emulsifying agent.

Preparations.—*Emplastrum Resinæ*—Resin Plaster, 'Adhesive Plaster' (Resin, Lead Plaster, Curd Soap—2 in 19).

Unguentum Resinæ—Resin Ointment (Resin, Yellow Wax, Simple Ointment, Almond Oil—4 in 15). Also used in all the plasters (except *Emp. Ammon. cum Hydrarg.*, *Emp. Ferri*, *Emp. Galbani*, *Emp. Hydrarg.*, *Emp. Saponis*, and *Emp. Plumbi*), and in *Ung. Terebinth.* and *Charta Epispastica.*

Group XXVI.—Benzoin and Benzoic Acid.

Benzoinum—'Gum Benjamin,' Benzoin.

Production.—A balsamic resin from *Styrax Benzoin*.

Characters.—There are two kinds of Benzoin, 'Siam Benzoin,' in small light-red tears or pieces, and 'Sumatra,' in large lumps, which have a white and reddish-brown marbled, mottled, granite-like appearance. Both kinds (the Sumatra is much the commonest) have an agreeable fragrant odour, which is very characteristic. The resin is soluble in spirit and solution of alkalies.

Composition.—Several resins, 'Benzoic Acid' (up to 20 per cent.), and a volatile oil, 'Styrol,' on which the odour depends. 'Vanillin' and 'Cinnamic Acid' are also sometimes present.

Prescribing.—Not used alone. Chiefly used as a preservative and perfuming agent (in incense, etc.). *Tinctura Benzoini Comp.*, 'Friar's Balsam,'

is much used as an application to cuts and wounds, and is also given internally.

Preparations.—*Adeps Benzoatus*—Benzoated Lard (Prepared Lard, Benzoin, in coarse powder). The lard is melted, the Benzoin added, and the mixture digested with heat for two hours, and strained. The lard dissolves essential oil and Benzoic Acid, which acts as a preservative, and prevents the lard from becoming rancid.

Tinctura Benzoini Composita—Compound Tincture of Benzoin, 'Friar's Balsam' (Benzoin, Storax, Balsam of Tolu, Socotrine Aloes, S.V.R. ; Maceration — 2 oz. to 1 pint). *Dose.* — 1 dram. Dispense with mucilage.

Benzoin is also used in Unguentum Cetacci.

*80. *Acidum Benzoicum*—Benzoic Acid;



Production.—An acid prepared by subliming Benzoin.

Characters.—In white (or slightly yellow) shining feathery crystals. Velvety to the touch. Odour agreeable and aromatic. Slightly soluble in water (1 in 400), freely in spirit (1 in 4).

Recognition.—The shining appearance, soft feel, and characteristic odour, at once identify Benzoic Acid. Absolutely pure Benzoic Acid has no odour, and may be had in large colourless crystals ; but the Benzoic Acid of the 'Pharmacopœia' has the above characters. Compare the drug with Salicylic Acid, which is of a different shape, not shining, has a harsh feel, and no smell ; with Quinine, which has no smell, and is not shining ; and with Tannic and Gallic Acids, the former with a different smell, and a darker colour, and the latter with quite a different shaped crystal.

Prescribing.—Benzoic Acid is sometimes used externally in ointments, etc. Locally, lozenges

are valuable, and much used. Internally it may be given in mixture, with a suspending agent; but the soluble Benzoates are much better.

Dose.—15 grains.

Incompatibles.—See Sodii Benzoas.

Preparations.—*Trochisci Acidi Benzoici*—Benzoic Acid Lozenges ($\frac{1}{2}$ grain in each). *Dose.*—5.

Benzoic Acid is also contained in Tinct. Camph. Co., and Tinct. Opii Ammoniata.

Ammonii Benzoas—Benzoate of Ammonium;



Production.—By dissolving Benzoic Acid in a solution of Ammonia, evaporating, and crystallizing.

Characters.—Colourless, or slightly buff coloured, pearly scales. Soluble in water (1 in 5); in spirit (1 in 18). Smells of Benzoic Acid.

Prescribing.—In solution. Note the Incompatibles.

Dose.—20 grains.

Incompatibles.—Iron Salts, Acids, and Alkalies.

Sodii Benzoas—Benzoate of Sodium.

Production.—By neutralizing Benzoic Acid with solution of Carbonate of Sodium, and evaporating to dryness.

Characters.—Small white granular masses, or a white powder. Little or no odour. Very soluble in water; in spirit (1 in 24). Taste sweetish.

Prescribing.—As the Ammonium Salt.

Dose.—30 grains.

Incompatibles.—As those of Ammon. Benzoas.

Group XXVII.—Tannic Acid, and other Astringents.

*81. **Acidum Tannicum**—Tannic Acid, 'Tannin.'

Production.—A 'glucosidal substance' obtained from Galls. Powdered Galls (previously exposed

to a damp atmosphere) are made into a paste with Ether, the paste pressed, and the process repeated with Ether containing a little water. The mixed ethereal liquids are evaporated, and the residue dried is Tannic Acid.

Characters. — Pale buff-coloured, crystalline powder, or small masses. Very light and soft to the touch, and with a faint peculiar odour. Taste very astringent. Soluble in water (5 in 4), in spirit freely, and in glycerine (1 in 3). Almost insoluble in pure ether.

Recognition.—Tannic Acid is easily recognised by its colour, general appearance, and faint but peculiar odour. Some samples of Benzoic Acid have about the same colour, but the odour and shining appearance of the latter easily distinguish it.

Prescribing.—Tannic Acid may be applied dry, as a styptic to bleeding surfaces. Ointments, lotions, and injections containing it are largely used. Internally Tannic Acid may be given in solution (note the Incompatibles), the Glycerine as an application to the throat is much employed. Lozenges and Suppositories are also popular.

Dose.—10 grains.

Incompatibles. — All Alkaloids and preparations containing them; Antipyrin, Iron, Lead, Silver, Copper, Mercury, and Antimony Salts; Gelatinous matter. Emulsions are usually curdled by Tannic Acid.

Preparations.—*Glycerinum Acidi Tannici*—Glycerine of Tannic Acid (Tannic Acid, Glycerine—1 to 4).

Suppositoria Acidi Tannici—Suppositories of Tannic Acid (Tannic Acid, Oil of Theobroma—3 grains in each).

Suppositoria Acidi Tannici cum Sapone—Suppositories of Tannic Acid with Soap (Tannic Acid,

Glycerine of Starch, Curd Soap, Starch in powder—3 grains in each).

Trochisci Acidi Tannici—Tannic Acid Lozenges ($\frac{1}{2}$ grain in each). Dose.—6.

These preparations should not be brought into contact with iron vessels or implements.

*82. **Acidum Gallicum**—Gallic Acid ;



Production.—By boiling powdered galls with dilute Sulphuric Acid; the mixture is strained through calico, and the strained liquid on cooling deposits the Gallic Acid.

Characters.—Pale fawn-coloured, needle-shaped crystals, or crystalline powder. No odour; taste acid, not astringent. But little soluble in water (1 in 100). Soluble in spirit (1 in 8), and in glycerine (1 in 20).

Recognition.—Gallic Acid is recognised by its colour, the shape of its crystals, and the absence of odour. Other similar shaped bodies are white or have an odour.

Prescribing.—Sometimes used externally in the form of the Glycerinum. Internally in mixtures. The Gallic Acid should be powdered as finely as possible, and suspended with mucilage.

Dose.—10 grains.

Incompatibles.—Metallic salts, especially iron, Spirit of Nitrous Ether. Does not precipitate gelatine.

Preparation.—*Glycerinum Acidi Gallici*—Glycerine of Gallic Acid (Gallic Acid and Glycerine—1 to 4).

Gallæ—Galls, 'Gall Nuts.'

Production.—Excrescences produced by the puncture of an insect (*Cynips Gallæ Tinctoria*) in the wood of a species of oak, the *Quercus Infectoria*.

Characters.—Hard spherical masses, from half an

inch to three-quarters in diameter. Dark olive-green externally, with numerous small conical projections. Internally, buff-coloured, and slightly glossy, with a small central cavity. No odour; taste astringent.

Composition.—Gallico-tannic, Tannic Acid, or Tannin, up to 70 per cent. Gallic Acid is also present in the free state up to 3 per cent. Resin and Sugar.

Prescribing.—Not often used internally, since Tannic and Gallic Acids are better. Externally the two ointments are much used.

Incompatibles.—As those of Tannic and Gallic Acids.

Preparations.—*Tinctura Gallæ*—Tincture of Galls (Galls, Proof Spirit; Maceration and Percolation—1 in 8). *Dose.*—2 drams.

Unguentum Gallæ—Ointment of Galls (Galls in powder, Benzoated Lard—80 grains in 1 oz.).

Unguentum Gallæ cum Opio—Ointment of Galls with Opium (Ointment of Galls, Powdered Opium—32 grains Opium in 1 oz.).

*83. **Kino**—Kino.

Production.—The juice (naturally dried) from the trunk of *Pterocarpus Marsupium*.

Characters.—In small shining black, or reddish-black, fragments, translucent and ruby-red at the edges. No smell; taste astringent; tinges the saliva blood-red. Soluble in Rectified Spirit, and partially so in water.

Recognition.—The appearance of the small shining fragments of Kino is peculiar, and easily enables it to be identified. Do not confound it with Aloes in small pieces (which have an odour), or with Guaiacum Resin, which is tinged with green.

Composition.—A variety of Tannic Acid, known as 'Kino-tannic Acid,' up to 75 per cent. ('Kino red' is a decomposition product of this body), and a small quantity of 'Pyrocatechin.'

Prescribing.—Kino is not used externally. Internally generally in its compound powder (q.v.) (remember that this preparation contains opium), and in mixtures by the tincture.

Dose.—30 grains.

Incompatibles.—Iron and all Metallic Salts, Gelatine, Mineral Acids, Alkalies and their Carbonates, Antipyrin.

Preparations.—*Pulvis Kino Compositus*—Compound Powder of Kino (Kino, Opium, Cinnamon—3 in 4 Kino, 1 in 20 Opium). *Dose.*—20 grains.

Tinctura Kino—Tincture of Kino (Kino, Glycerine, Water, Rectified Spirit—2 oz. in 1 pint; Maceration). *Dose.*—2 drams.

The Glycerine is added to prevent the Tincture from becoming gelatinous.

Kino is also contained in *Pulvis Catechu Comp.*

*84. *Catechu* — *Catechu*, *Catechu Pallidum*, 'Gambier.'

Production.—A dry extract of the leaves and young shoots of *Uncaria Gambier*.

Characters.—In cubes about an inch square on each side. Externally a dirty reddish-brown, internally a pale reddish-brown, and exhibiting a peculiar clay-like structure. Easily broken. No odour, taste sweetish and astringent. Entirely soluble in hot water.

Recognition.—The peculiar clay-like appearance of *Catechu* at once distinguishes it. Remember that it is an extract and not a natural product.

Composition.—A crystalline substance. 'Catechin' or 'Catechuic Acid'; this body, by the action of the saliva (and other agents), becomes converted into a variety of Tannic Acid, called 'Catechutannic Acid'; hence the value of *Catechu* as a medicine.

Prescribing.—Not used externally. Internally the Tincture in mixtures is much used. The com-

pound powder is useful for children, and the Lozenges (owing to the reaction with the saliva stated above), are favourite astringents.

Dose.—30 grains.

Incompatibles.—Iron and Metallic Salts, Alkalies, Gelatine, Antipyrin.

Preparations.—*Infusum Catechu*—Infusion of Catechu (Catechu, Cinnamon, Boiling Water—16 grains in 1 oz.). *Dose.*—2 ozs.

Pulvis Catechu Compositus—Compound Catechu Powder (Catechu, Kino, Rhatany, Cinnamon, Nutmeg—2 in 5). *Dose.*—40 grains.

Tinctura Catechu—Tincture of Catechu (Catechu, Cinnamon, Proof Spirit; Maceration—1 in 8). *Dose.*—2 drams.

Trochisci Catechu—Lozenges of Catechu (1 grain in each). *Dose.*—6.

Hamamelidis Cortex—Hamamelis Bark, 'Witch Hazel' Bark.

Production.—The dried bark of Hamamelis Virginica.

Characters.—In thin, slightly curved pieces, gray outside, marked with small brown oval protuberances (lenticels). Interior, a light cinnamon-brown, fibrous. No odour; taste slightly astringent.

Composition.—A small quantity of volatile oil, Tannin, and a bitter principle. No satisfactory analysis has been made.

Prescribing.—See Hamamelidis Folia.

Incompatibles.—Antipyrin, Metallic Salts, especially Iron.

Preparation.—*Tinctura Hamamelidis*—Tincture of Hamamelis (Hamamelis Bark, Proof Spirit; Maceration, and Percolation—2 oz. to 1 pint). *Dose.*—1 dram.

Hamamelidis Folia—Hamamelis Leaves, 'Witch Hazel' Leaves, 'Winter Bloom.'

Production.—The dried leaves of *Hamamelis Virginica*.

Characters.—Oval leaves from four to six inches long; the apex is blunt, and the edge toothed and wavy. The under surface of the leaf has prominent veins. No particular odour. Taste bitter and astringent.

Composition.—See *Hamamelis Bark*.

Prescribing.—*Hamamelis* is used externally in the form of ointment made with the liquid extract. A distilled preparation of the leaves (a colourless liquid with a peculiar smell), known as 'Hazeline,' is popular as an external application to piles, etc. Internally, the tincture or liquid extract in mixtures.

Incompatibles.—See *Hamamelis Bark*.

Preparations.—*Extractum Hamamelidis Liquidum*—Liquid Extract of *Hamamelis* (an Alcoholic and Aqueous extract—1 = 1). *Dose.*—5 minims.

Unguentum Hamamelidis—Ointment of *Hamamelis* (liquid extract 1, simple ointment 9; mix).

Group XXVIII.—Copaiba and Cubebs.

*85. **Copaiba**—Copaiba, Copaiva, Balsam of Copaiba, Oleo-resin of Copaiba.

Production.—An oleo-resin obtained from the trunk of *Copaifera Langsdorffii*.

Characters.—A light-yellow, or yellowish-brown, thick liquid. Sometimes slightly fluorescent. Odour peculiar, persistent, and very disagreeable. Insoluble in water, soluble in rectified spirit (1 in 4), and in fixed and volatile oils.

Recognition.—Copaiba is at once recognised by its appearance and peculiar, unpleasant smell.

Composition.—The drug is an oleo-resin, *i.e.*, a resin dissolved in a volatile oil. It is sometimes

incorrectly called a Balsam. The volatile oil varies in amount up to 60 per cent. The resin is acid and is called 'Copaivic Acid.' A bitter principle is also said to be present.

Prescribing.—Not used externally. Internally small doses may be given in pills, but capsules are a more suitable form; these generally contain 25 minims in each. Copaiba is also much used in mixtures; it may be emulsified with mucilage, or saponified with potash. The taste is disgusting, and should be disguised as much as possible, and the drug not given on an empty stomach.

Dose.—1 dram.

Oleum Copaibæ—Oil of Copaiba.

Production.—The essential oil obtained by distilling Copaiba.

Characters.—A colourless or pale-yellow oil. It is thin when fresh, but on keeping some time becomes thick and viscid. It possesses the smell and taste of Copaiba. Soluble in spirit.

Prescribing.—In capsules, or in mixture with mucilage or yolk of egg. The resin left behind on distilling this oil—'Resin of Copaiba'—although not official, is often prescribed in pills.

Dose.—20 minims.

*86. **Cubeba**—Cubebs, 'Tailed Pepper.'

Production.—The dried, full-grown, but unripe, fruit of *Piper Cubeba*.

Characters.—Small globular fruits about one-sixth of an inch in diameter. Black or brownish-black. The surface of each fruit is much wrinkled and tapers with a rounded stalk. The whole fruit much resembles a large black peppercorn mounted on a stalk. The odour of the fruit is strong, and peculiar and somewhat suggestive of camphor.

Recognition.—The wrinkled black appearance of the fruit, with the stalk attached, and the strong

and very characteristic odour at once identify Cubebs. The stalk varies in length from an eighth of an inch, or less, up to half an inch. In powder, cubebs has a reddish-brown colour, and the peculiar odour is very marked.

Composition.—A white crystalline substance, 'Cubebin' (up to 2·5 per cent.), said to resemble in its properties the principle of pepper, Piperine. A resin (3 per cent.) consisting chiefly of 'Cubebic Acid,' and about 15 per cent. of an essential oil.

Prescribing.—Not used externally. Cubebs are used locally in Lozenges (for the throat); in mixtures, with a suspending agent. The most common form of exhibiting it is in the form of boluses. A dose is made into a paste with syrup, the mass wrapped in wafer paper, and swallowed. The oleo-resin may be given in mixture with mucilage.

Dose.—2 drams

Preparations.—*Oleo-Resina Cubebæ*—Oleo-resin of Cubebs (Cubebs in powder, Ether). The Cubebs are percolated with the Ether, the ethereal extract evaporated, and the oily residue allowed to stand until a deposit ceases to form; the mixture is strained or decanted, the decanted liquid being the oleo-resin. In dispensing rub with a little powdered acacia or mucilage and add water gradually. *Dose.*—30 minims.

Tinctura Cubebæ—Tincture of Cubebs (Cubebs, Rectified Spirit; Maceration, and Percolation—1 in 8). *Dose.*—2 drams.

Oleum Cubebæ.

Production.—The essential oil distilled from Cubebs.

Characters.—A thin, colourless, or greenish-yellow fluid. Smells strongly of Cubebs. Soluble in spirit.

Composition.—Contains a neutral hydrocarbon, 'Cubebene,' $C_{30}H_{48}$, and a solid crystalline substance, 'Cubeb Camphor,' $C_{30}H_{48}2H_2O$.

Prescribing.—In capsules, or in mixture with mucilage. Sometimes given by inhalation.

Dose.—20 minims.

Group XXIX.—Colchicum.

*87. **Colchici Cormus**—Colchicum Corm, 'Meadow Saffron' Corn.

Production.—The fresh, or sliced, and dried corm (solid, enlarged, underground stem) of Colchicum Autumnale.

Characters.—In slices about the eighth of an inch thick, of a well-marked kidney shape. The edges covered with a light-brown layer, with more or less distinct furrows. Flat surfaces, white or slightly yellow, with a rough, mealy appearance. No odour.

Recognition.—The peculiar kidney-shaped appearance at once distinguishes Colchicum Corm. It is not so well-marked in some pieces as in others, but is always observable. The slices vary in breadth, but are rarely more than an inch across at their widest part.

Composition.—An active principle, 'Colchicin,' about 10 per cent. of Starch, together with Resin, Tannin, and Sugar.

Prescribing.—Colchicum Corm can be given in pills, using the powdered drug or one of the extracts. In mixtures the Vinum is most used.

Dose (in powder).—8 grains.

Incompatibles.—Astringent drugs, Tinctures of Iodine and Guaiacum, Ferric Salts.

Preparations.—*Extractum Colchici*—Extract of Colchicum (a fresh extract). *Dose.*—2 grains.

Extractum Colchici Aceticum—Acetic Extract of Colchicum (a fresh extract, with Acetic Acid).
Dose.—2 grains.

Note that the dose of these preparations is the same ; the Acetic extract is generally preferred.

Vinum Colchici—Wine of Colchicum (Colchicum, Sherry—4 oz. to 1 pint ; Maceration). *Dose*.—30 minims.

Colchici Semina—Colchicum Seeds, 'Meadow Saffron' Seeds.

Production.—The dried, ripe seeds of Colchicum Autumnale.

Characters.—Small, reddish-brown seeds about the size of black mustard seeds. Each seed is of a pointed globular shape. They are very hard and tough. No odour.

Composition.—As that of the Corm, but no starch, and a little fixed oil.

Prescribing.—The Tincture in mixtures.

Incompatibles.—As those of the Corm.

Preparation. — *Tinctura Colchici Seminum*—Tincture of Colchicum Seeds (Colchicum Seeds, Proof Spirit ; Maceration, and Percolation—1 in 8).
Dose.—30 minims.

Group XXX.—Filix Mas and Santonin.

*88. **Filix Mas**—Male Fern.

Production.—The Rhizome (underground stem) with the bases of the leaf-stalks of *Aspidium Filix-Mas*. Must not be more than one year old.

Characters.—A mass of curved, short, dark-brown stalks, closely overlapping each other, along a light brown axis. The spaces between the stalks are more or less filled up with stiff brown hairs or threads. Each piece has the appearance of having been split off from a similar piece. The pieces

vary in length from 3 to 6 inches, and in breadth up to 2 inches. No particular odour.

Recognition.—The general appearance of Male Fern is most peculiar and characteristic, and it cannot be confounded with any other drug.

Composition.—A fatty green oil, 'Filicic Acid,' regarded as the active principle, and a species of Tannic Acid.

Prescribing.—Internally, by means of the liquid extract, in a draught. Like most drugs for the destruction of worms, it is given on an empty stomach, and followed by a purgative.

Preparation.—*Extractum Filicis Liquidum*—Liquid Extract of Male Fern, 'Oil of Male Fern.' (Male Fern in powder, Ether.)

The Male Fern is exhausted with Ether, and the ethereal solution evaporated, until all the Ether is driven off; the residue is Extract of Male Fern.

In dispensing, shake the bottle containing the extract, measure the dose in a warmed measure, rub down with a little powdered gum or mucilage, and dilute with water. It may be also given in capsules. *Dose.*—30 minims.

*89. *Santoninum*—Santonin.

Production.—A crystalline principle prepared from Santonica ('Wormseed'), the dried, unexpanded flower-heads of *Artemisia Maritima*. The Santonica is boiled with water and lime. Santonate of Calcium is thus formed. The mixture is strained, and Hydrochloric Acid added; this precipitates the Santonin, which is collected, purified with animal charcoal, and recrystallized in a dark place from Rectified Spirit.

Characters.—If the Santonin has not been much exposed to light, it is in the form of small, flat, colourless, shining crystals. On exposure to light, however, Santonin soon acquires a bright yellow

colour, and then somewhat resembles Iodoform, but is deeper in colour. It has no odour. With an alcoholic solution of potash it immediately yields a violet-red colour. Almost insoluble in water. Taste feebly bitter.

Recognition. — Unaltered Santonin can be recognised by the peculiar appearance of its crystals; they have a characteristic shape and shining appearance. Compare them with Benzoic Acid, Salicylic Acid, and Gallic Acid. Yellow Santonin is easily recognised by its colour and absence of smell.

Prescribing. — Small doses may be given by means of the Lozenges. Larger, in powder, with sugar, or suspended by mucilage. Like Male Fern, it is usually followed by a purgative. It may also be ordered with an aperient powder, such as Pulv. Jalap. Co. The alteration in colour does not affect its properties.

Dose.—6 grains.

Incompatibles.—Potash.

Preparation.—*Trochisci Santonini*—Lozenges of Santonin (1 grain in each). *Dose.*—6.

Group XXXI.

*90. **Ergota**—Ergot, 'Ergot of Rye.'

Production.—The spawn of a species of Fungus, the *Claviceps Purpurea*, deposited on rye.

Characters.—More or less curved bodies, pointed at each end, varying in thickness up to that of slate pencil, and to an inch and a half in length. Obscurely triangular in form, and marked on each face with a more or less distinct furrow. Colour dark-brown externally, with sometimes a violet tint. Brittle, and when broken the broken surfaces yellowish or pinkish-white. Odour shrimp, most

peculiar, and disagreeable, suggestive of decay; more marked in the powdered drug, especially when treated with potash.

Recognition.—The very peculiar appearance of Ergot at once identifies it. The odour also is very characteristic, and will identify the drug (grayish-brown in colour) when in powder. It is also noticeable in all the preparations. Ergot frequently has a smell of camphor, which is used to preserve it from insects, but even then the odour of the drug is also perceptible.

Composition.—‘Sclerotic Acid,’ an inodorous, tasteless body, uncrystallizable, soluble in water. This is said to be the most active principle. ‘Ergotine,’ an alkaloid. ‘Ecboline’ is probably a modification of this body. Colouring matters, ‘Mannite,’ a Sugar, Potassium Salts, and about 30 per cent. of a fixed oil.

Prescribing.—Ergot may be given internally in powder, but the liquid preparations are far preferable to this form, or to pills of the Pharmacopœial Ergotin. The Liquid Extract is chiefly used. The nauseous taste of Ergot may be almost disguised by Spirit of Chloroform. Ergot is also given by hypodermic injection.

Dose (in powder).—30 grains.

Incompatibles.—Astringents, Ferric Salts.

Preparations.—*Extractum Ergotæ Liquidum*—Liquid Extract of Ergot (Ergot, Water, Rectified Spirit).

The Ergot is exhausted with water, the liquid evaporated, spirit added, and the mixture filtered (1 = 1). *Dose.*—30 minims.

Ergotinum — Ergotin, ‘Bonjean’s Ergotine,’ ‘Ergotine,’ Extract of Ergot, Purified Extract of Ergot.

Liquid Extract of Ergot is evaporated to a

syrupeous consistence, mixed with spirit, the mixture allowed to stand, and filtered, and the filtrate evaporated to a soft extract. *Dose*.—5 grains.

Injectio Ergotini Hypodermica—Hypodermic Injection of Ergotin (Ergotin 1, Camphor Water 2; dissolve). *Dose*.—10 minims.

This preparation should be freshly made.

Infusum Ergotæ—Infusion of Ergot (Ergot, Boiling Water— $\frac{1}{2}$ oz. in 1 pint, $\frac{1}{2}$ hour). *Dose*.—2 oz.

Tinctura Ergotæ—Tincture of Ergot (Ergot, Proof Spirit; Maceration and Percolation—1 in 4). *Dose*.—30 minims.

Group XXXII.

*91. *Oleum Morrhuæ*—Cod Liver Oil, *Oleum Jecoris Aselli*.

Production.—The oil extracted from the fresh liver of the Cod, *Gadus Morrhua*. The fresh livers are cut open and washed in cold water, then placed in a vessel and exposed to a heat (by steam) not exceeding 180° F. The oil separates and floats on the surface of the mass, whence it is collected and filtered.

Characters.—A pale-yellow fixed oil, with a peculiar fishy smell. Exposed to the air, in a thin film, it dries slowly to a resinous mass.

Recognition.—Cod-liver Oil is at once recognised by its odour and colour. These vary considerably, but the former is always more or less fishy or shrimp-like, and the latter more or less pale-yellow.

Composition.—Chiefly consists of glycerides of the fatty acids (e.g., Olein and Margaric). Traces of Iodine and Bromine are present. It is now generally believed to contain a body containing Phosphorus of the nature of 'Lecithin' (see Watts' 'Organic Chemistry'), and, according to some authorities, Bile Acids.

Prescribing.—The oil to be used in medicine is always of a pale-yellow colour. Brown oils are to be regarded with suspicion. Cod-liver Oil is occasionally rubbed in externally as a nutritive for children, it is easily absorbed, but the process is objectionable. Internally, the oil may be given in various ways. Alone, if the taste is not objected to, or floated on wine, in which form it cannot be tasted at all; or in emulsion, with mucilage and a flavouring agent (such as Bitter Almonds). Some people take it easily with a little salt and pepper. The solution in Extract of Malt is very palatable.

Dose.—8 drams.

Group XXXIII.

*92. **Cantharis** — Cantharides, ' Spanish Fly,' ' Blistering Fly.'

Production.—The entire beetle, Cantharis Vesicatoria.

Characters.—The beetles are up to an inch long, and about a quarter of an inch broad, with two long wing-sheaths of an iridescent coppery-green, covering the whole of the back. The under-surface of the body and the legs have also a metallie appearance, and frequently bear a number of small light-brown parasites. The wings are brown and membranous. The odour of the drug is powerful and offensive.

Recognition.—The entire beetle is at once recognised. The powder is of a dark-brown colour, exhibiting small shining fragments of the wing-cases; by this character and the odour it may be easily identified.

Composition.—A powerful active principle, ' Cantharidin ' (up to 1 per cent.), colourless, shining crystals, soluble in alcohol and acetic acid. A greenish volatile oil and fatty matter.

Prescribing.—Externally, Cantharides is very largely used as a blistering agent, in plasters, ointments, solutions, etc. It is also the active ingredient in most preparations for stimulating the growth of the hair. It is not often used internally, when so by tincture only, in mixture.

Preparations.—*Acetum Cantharidis*—Vinegar of Cantharides (Cantharides, Glacial Acetic Acid, Acetic Acid, digestion at 200° F. and Percolation—1 in 12).

Charta Epispastica—Blistering Paper (White Wax, Spermaceti, Olive Oil, Resin, Canada Balsam, Powdered Cantharides, Water; digested together, the waxy matter separated and mixed with the Canada Balsam. Paper is coated with the mixture).

Emplastrum Calefaciens—Warming Plaster (Cantharides in powder, Expressed Oil of Nutmeg, Yellow Wax, Resin, Resin Plaster, Soap Plaster, Boiling Water. The Cantharides is infused in the water, pressed, strained, and evaporated to one-third, the other ingredients melted, and the whole mixed together—1 in 24).

Emplastrum Cantharidis—Cantharides Plaster (Cantharides, Yellow Wax, Suet, Lard, Resin—1 in 3). A soft plaster. Blisters are spread of it with the thumb on adhesive plaster spread on calico.

Liquor Epispasticus.—Blistering Liquid, Linimentum Cantharidis (Cantharides, Acetic Ether, Percolation—1 in 4).

Collodium Vesicans—Blistering Collodion (Blistering Liquid 20, Pyroxylin 1).

Tinctura Cantharidis—Tincture of Cantharides (Cantharides, Proof Spirit; Maceration— $\frac{1}{4}$ oz. to 1 pint). *Dose.*—20 minims.

Unguentum Cantharidis—Ointment of Cantharides (Cantharides, Yellow Wax, Olive Oil—1 in 8).

INDEX AND REFERENCE TABLE

OF

DRUGS, PREPARATIONS, STRENGTHS AND DOSES.

DRUGS AND PREPARATIONS.	STRENGTHS.	DOSES.	PAGE.
<i>Acetanilide</i> - - -	—	3 to 10 grains	98
<i>Acetic Acid</i> - - -	33 per cent.	—	29
Dilute Acetic Acid - - -	1 to 7	1 dram to 1 oz.	
Glacial Acetic Acid - - -	99 per cent.	—	
<i>Acid, Arsenious</i> - - -	—	$\frac{1}{60}$ to $\frac{1}{12}$ grain	39
Liquor (acid) - - -	1 per cent.	2 to 8 minims	
Liquor (alkaline) - - -	1 per cent.	2 to 8 minims	
<i>Acid, Boric</i> - - -	—	30 grains	30
Ointment - - -	1 in 7	—	
<i>Acid, Carbolic</i> - - -	—	1 to 3 grains	100
Glycerine - - -	1 to 4	—	
Liquid Carbolic Acid - - -	10 per cent. water	1 to 4 minims	
Ointment - - -	1 in 19	—	
Suppositories with Soap - - -	1 grain in each	—	
<i>Acid, Citric</i> - - -	—	10 to 30 grains	30
<i>Acid, Gallic</i> - - -	—	2 to 10 grains	176
Glycerine - - -	1 to 4	—	
<i>Acid, Hydrobromic, Dilute</i> - - -	10 per cent.	15 to 50 minims	44
<i>Acid, Hydrochloric</i> - - -	32 per cent.	—	31
Dilute Acid - - -	8 in 26½	10 to 30 minims	
<i>Acid, Hydrocyanic, Dilute</i> - - -	2 per cent.	2 to 8 minims	31
Tincture Chlorof. and Morph. - - -	1 in 16	—	
<i>Acid, Meconic</i> - - -	—	—	110
<i>Acid, Nitric</i> - - -	70 per cent.	—	32
Dilute Acid - - -	6 in 31	10 to 30 minims	
Nitrohydrochloric - - -	Nitric 3, Hydroch. 4, in 25	5 to 20 minims	

DRUGS AND PREPARATIONS.	STRENGTHS.	DOSES.	PAGE.
<i>Acid, Phosphoric, Con.</i>	66·3 per cent.	2 to 5 minims	72
<i>Dilute Acid</i> . . .	13·8 per cent.	10 to 30 minims	
<i>Acid, Salicylic</i> . . .	—	5 to 30 grains	102
<i>Ointment</i> . . .	1 in 28	—	
<i>Acid, Sulphuric</i> . . .	98 per cent.	—	33
<i>Aromatic Acid</i> . . .	3 in 43	5 to 30 minims	
<i>Dilute Acid</i> . . .	7 in 83½	5 to 30 minims	
<i>Acid, Sulphurous</i> . . .	6·4 per cent.	½ to 1 dram	34
<i>Acid, Tannic</i> . . .	—	2 to 10 grains	174
<i>Glycerine</i> . . .	1 in 6	—	
<i>Lozenges</i> . . .	½ grain in each	1 to 6	
<i>Suppositories</i> . . .	3 grains in each	—	
<i>Suppositories with Soap</i>	3 grains in each	—	
<i>Acid, Tartaric</i> . . .	—	10 to 30 grains	34
<i>Aconite Leaves</i> . . .	—	—	108
<i>Extract</i> . . .	—	¼ to 1 grain	
<i>Aconite Root</i> . . .	—	—	106
<i>Liniment</i> . . .	1 in 1½	—	
<i>Tincture</i> . . .	1 in 8	5 to 15 minims	
<i>Aconitine</i> . . .	—	—	107
<i>Ointment</i> . . .	8 grains in 1 oz.	—	
<i>Alcohol, Ethylic</i> . . .	98 per cent.	—	88
<i>Aloes, Barbadoes</i> . . .	—	2 to 6 grains	155
<i>Enema</i> . . .	40 grains in each	—	
<i>Extract</i> . . .	1½ in 1	1 to 6 grains	
<i>Pill</i> . . .	1 in 2	5 to 10 grains	
<i>Pill, with Iron</i> . . .	1 in 5½	5 to 10 grains	
<i>Aloes, Socotrine</i> . . .	—	—	156
<i>Compound Decoction</i>	4½ grains in 1 oz.	½ to 2 oz.	
<i>Enema</i> . . .	10 grains in each	—	
<i>Extract</i> . . .	1½ in 1	1 to 6 grains	
<i>Pill</i> . . .	1 in 2	5 to 10 grains	
<i>Pill, with Asafetida</i>	1 in 4	5 to 10 grains	
<i>Tincture</i> . . .	1 in 40	1 to 2 drams	
<i>Wine</i> . . .	2 grains in 1 dram	1 to 2 drams	
<i>Aloin</i> . . .	—	½ to 2 grains	158
<i>Alum</i> . . .	—	10 to 20 grains	34
<i>Glycerine</i> . . .	1 in 7½	—	
<i>Alum, Dried</i> . . .	—	—	35
<i>Ammoniacum</i> . . .	—	10 to 20 grains	129
<i>Mixture</i> . . .	13½ grains in 1 oz.	½ to 1 oz.	
<i>Plaster, with Mercury</i>	4 in 5	—	

DRUGS AND PREPARATIONS.	STRENGTHS.	DOSES.	PAGE.
<i>Ammonium Acetate</i>	—	—	37
Solution - - -	1 to 3	2 to 6 drams	
Strong Solution - -	—	25 to 75 minims	
<i>Ammonium Benzoate</i>	—	10 to 20 grains	174
<i>Ammonium Bromide</i>	—	2 to 20 grains	44
<i>Ammonium Carbonate</i>	—	3 to 10 grains	35
<i>Ammonium Chloride</i>	—	5 to 20 grains	36
<i>Ammonia</i> - - -	—	—	36
Aromatic Spirit - -	—	$\frac{1}{2}$ to 1 dram	
Fœtid Spirit - - -	—	$\frac{1}{2}$ to 1 dram	
Liniment - - -	1 in 4	—	
Liquor - - -	1 to 2 (10 per cent.)	10 to 20 minims	
Strong Liquor - - -	32.5 per cent.	—	
<i>Amyl Nitrite</i> - - -	—	{ (Inhal.) 2 to 5 minims. (Mouth) $\frac{1}{3}$ to 1 minim }	96
<i>Antimony Oxide</i> - -	—	1 to 4 grains	
Antinomial Powder -	1 in 3	3 to 5 grains	72
<i>Antimony, Tartarated</i>	—	{ $\frac{1}{15}$ to $\frac{1}{3}$ (Diaph.) 1 to 2 grains (Emetic) }	38
Ointment - - -	1 in 5	—	
Wine - - -	2 grains in 1 oz.	5 to 60 minims	
<i>Antipyrin (Phenazonum)</i>	—	3 to 20 grains	99
<i>Apomorphine</i> }	—	{ Hyp. $\frac{1}{25}$ to $\frac{1}{10}$ gr.	116
<i>Hydrochlorate</i> }	—	{ Mouth $\frac{1}{10}$ to $\frac{1}{3}$ gr.	
<i>Arsenic Iodide</i> - -	—	$\frac{1}{30}$ grain	40
Solution, with Mercury			
Iodide - - -	1 in 100	10 to 30 minims	
<i>Asafoetida</i> - - -	—	5 to 20 grains	128
Compound Pill - -	2 in 7	5 to 10 grains	
Enema - - -	30 grains in 4 oz.	—	
Pill, with Aloes - -	1 in 4	5 to 10 grains	
Spirit, with Ammonia	1½ oz. in 1 pint	$\frac{1}{2}$ to 1 dram	
Tincture - - -	1 in 8	$\frac{1}{2}$ to 1 dram	
<i>Atropine</i> - - -	—	—	145
Ointment - - -	—	8 grains in 1 oz.	
<i>Atropine Sulphate</i>	—	$\frac{1}{100}$ to $\frac{1}{25}$ grain	146
Lamella - - -	$\frac{1}{8000}$ in each	—	
Solution - - -	1 in 100	1 to 4 minims	

DRUGS AND PREPARATIONS.	STRENGTHS.	DOSES.	PAGE.
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Extract -	—	$\frac{1}{4}$ to 1 grain	
Juice -	—	5 to 15 minims	
Tincture -	1 in 20	5 to 30 minims	
<i>Belladonna Root</i> -	—	—	143
Alcoholic Extract -	—	$\frac{1}{16}$ to $\frac{1}{4}$ grain	
Liniment -	1 in $1\frac{1}{2}$	—	
Ointment -	1 in 10	—	
Plaster -	1 in 5	—	
<i>Benzoin</i> -	—	—	172
Benzoated Lard -	1 in 50	—	
Compound Tincture -	2 oz. in 1 pint	$\frac{1}{2}$ to 1 dram	
<i>Bismuth Carbonate</i> -	—	5 to 20 grains	42
<i>Bismuth Citrate</i> -	—	2 to 5 grains	42
Ammonio Citrate -	—	2 to 5 grains	
Solution, with Ammonia -	40 grains in 1 oz.	$\frac{1}{2}$ to 1 dram	
<i>Bismuth Subnitrate</i> -	—	5 to 20 grains	43
Lozenges -	2 grains in each	1 to 6	
<i>Borax</i> -	—	5 to 40 grains	81
Glycerine -	1 in 6	—	
Honey -	56 grains in 1 oz.	—	
<i>Bromine</i> -	—	—	43
<i>Butyl Chloral Hydrate</i> -	—	5 to 15 grains	95
<i>Caffein</i> -	—	1 to 5 grains	125
<i>Caffein Citrate</i> -	—	2 to 10 grains	126
<i>Calcium Carb., Precipitated</i> -	—	10 to 60 grains	46
<i>Calcium Hydrate</i> -	—	—	45
Lime Water -	$\frac{1}{2}$ grain in 1 oz.	$\frac{1}{2}$ to 4 oz.	
Liniment (of Lime) -	1 in 2 Liq. Calc.	—	
Saccharated Solution -	7-11 grains in 1 oz.	15 to 60 minims	
<i>Calcium Hypophosphite</i> -	—	5 to 10 grains	73
<i>Calcium Phosphate</i> -	—	10 to 20 grains	72
<i>Calumba Root</i> -	—	5 to 20 grains	122
Extract -	—	2 to 10 grains	
Infusion -	1 in 20	1 to 2 oz.	
Tincture -	1 in 8	$\frac{1}{2}$ to 2 drams	
<i>Camphor</i> -	—	1 to 10 grains	168
Compound Liniment -	54 $\frac{1}{2}$ grains in 1 oz.	—	
Compound Tincture -	$\left\{ \begin{array}{l} 1\frac{1}{2} \text{ gr. in 1 oz.} \\ 2 \text{ grs. opium} \\ \text{in 1 oz.} \end{array} \right\}$	15 to 60 minims	

DRUGS AND PREPARATIONS.	STRENGTHS.	DOSES.	PAGE.
<i>Camphor—continued.</i>			
Liniment - - -	1 in 5	—	
Spirit - - -	1 in 10	10 to 30 minims	
Water - - -	$\frac{1}{2}$ grain in 1 oz.	1 to 2 oz.	
<i>Cannabis Indica</i> - - -	—	—	149
Extract - - -	—	$\frac{1}{4}$ to 1 grain	
Tincture - - -	1 oz. Ext. in 1 pint	5 to 20 minims	
<i>Cantharides</i> - - -	—	—	189
Blistering Collodion - - -	—	—	
Blistering Paper - - -	—	—	
Blistering Solution - - -	1 in 4	—	
Ointment - - -	1 in 8	—	
Plaster - - -	1 in 3	—	
Tincture - - -	1 in 80	5 to 20 minims	
Vinegar - - -	2 oz. in 1 pint	—	
Warming Plaster - - -	1 in 24	—	
<i>Cascara Bark, Sagrada</i> - - -	—	—	159
Extract - - -	—	2 to 8 grains	
Liquid Extract - - -	1=1	$\frac{1}{2}$ to 2 drams	
<i>Castor Oil</i> - - -	—	1 to 8 drams	153
Mixture - - -	3 drams in 1 oz.	$\frac{1}{2}$ to 2 oz.	
<i>Catechu</i> - - -	—	10 to 30 grains	178
Compound Powder - - -	1 in 24	20 to 40 grains	
Infusion - - -	16 grains in 1 oz.	1 to 2 oz.	
Lozenges - - -	1 grain in each	1 to 6	
Tincture - - -	1 in 8	$\frac{1}{2}$ to 2 drams	
<i>Chalk, Prepared</i> - - -	—	10 to 60 grains	46
Aromatic Powder - - -	1 in 4	10 to 60 grains	
Aromatic Powder, with			
Opium - - -	1 in 40 Opium	10 to 40 grains	
Mixture - - -	1 in 32	1 to 2 oz.	
<i>Chloral Hydrate</i> - - -	—	5 to 30 grains	39
Syrup - - -	10 grs. in 1 dram	$\frac{1}{2}$ to 2 drams	
<i>Chlorine Solution</i> - - -	2·66 grains in 1 oz.	10 to 20 minims	47
<i>Chloroform</i> - - -	—	3 to 10 minims	92
Compound Tincture - - -	1 in 10	10 to 30 minims	
Liniment - - -	1 in 2	—	
Spirit - - -	1 in 20	20 to 60 minims	
Tinct., with Morphine - - -	1 in 8	5 to 10 minims	
Water - - -	1 in 200	$\frac{1}{2}$ to 2 oz.	
<i>Cinchona Barks</i> - - -	—	—	132

DRUGS AND PREPARATIONS.	STRENGTHS.	DOSES.	PAGE.
<i>Cinchona Bark (Red)</i>	—	15 grs. to 2 drams	133
Acid Infusion	1 in 20	1 to 2 oz.	
Compound Tincture	2 oz. in 1 pint	$\frac{1}{2}$ to 2 drams	
Decoction	1 in 16	1 to 2 oz.	
Liquid Extract	5 p. c. alkaloids	5 to 10 minims	
Tincture	1 in 5	$\frac{1}{2}$ to 2 drams	
<i>Coca Leaves (Coca)</i>	—	$\frac{1}{2}$ to 2 drams	117
Liquid Extract	1=1	$\frac{1}{2}$ to 2 drams	
<i>Cocain Hydrochlorate</i>	—	$\frac{1}{2}$ to 1 grain	118
Lamella	$\frac{1}{200}$ grain in each	—	
Solution	10 per cent.	2 to 10 minims	
<i>Codein</i>	—	$\frac{1}{4}$ to 2 grains	117
<i>Cod-liver Oil</i>	—	1 to 8 drams	188
<i>Colchicum Corm</i>	—	2 to 8 grains	183
Acetic Extract	—	$\frac{1}{2}$ to 2 grains	
Extract	—	$\frac{1}{2}$ to 2 grains	
Wine	1 in 5	10 to 30 minims	
<i>Colchicum Seeds</i>	—	—	184
Tincture	1 in 8	10 to 30 minims	
<i>Collodium</i>	1 in 48	—	100
<i>Collodium Flexile</i>	—	—	100
<i>Colocynth Pulp</i>	—	2 to 8 grains	159
Compound Extract	1 to 4 $\frac{1}{2}$	2 to 10 grains	
Compound Pill	1 in 6	5 to 10 grains	
Pill, with Hyoscyamus	1 in 9	5 to 10 grains	
<i>Conium Leaves</i>	—	—	127
Compound Pill	—	5 to 10 grains	
Extract	—	2 to 6 grains	
Inhalation	1 in 26	20 minims	
Juice	—	30 to 60 minims	
Ointment	2 oz. juice in 1 oz.	—	
Poultice	1 oz. juice in each	—	
<i>Conium Fruit</i>	—	—	126
Tincture	1 in 8	20 to 60 minims	
<i>Copaiba</i>	—	$\frac{1}{2}$ to 1 dram	180
<i>Copaiba Oil</i>	—	5 to 20 minims	181
		($\frac{1}{4}$ to 2 grains)	
<i>Copper Sulphate</i>	—	(Astringent)	49
		5 to 10 grains	
		(Emetic)	
<i>Croton Oil</i>	—	$\frac{1}{3}$ to 1 minim	154
Liniment	1 in 8	—	



DRUGS AND PREPARATIONS.	STRENGTHS.	DOSES.	PAGE.
<i>Cubebs</i> - - - -	—	$\frac{1}{2}$ to 2 drams	181
Essential Oil - - -	—	5 to 20 minims	
Oleo Resin - - - -	—	5 to 30 minims	
Tincture - - - - -	1 in 8	$\frac{1}{2}$ to 2 drams	
<i>Digitalis Leaves</i> - - -	—	$\frac{1}{2}$ to $1\frac{1}{2}$ grains	150
Infusion - - - - -	3 grains in 1 oz.	2 to 4 drams	
Tincture - - - - -	1 in 8	10 to 30 minims	
<i>Elaterin</i> - - - - -	—	$\frac{1}{10}$ to $\frac{1}{10}$ grain	161
Compound Powder - - -	1 in 40	$\frac{1}{2}$ to 5 grains	
<i>Elaterium</i> - - - - -	—	$\frac{1}{10}$ to $\frac{1}{2}$ grain	161
<i>Ergot</i> - - - - -	—	20 to 30 grains	186
Ergotin - - - - -	—	2 to 5 grains	
Hypodermic Injection -	1 to 2	3 to 10 minims	
Infusion - - - - -	1 in 40	1 to 2 oz.	
Liquid Extract - - -	1=1	15 to 30 minims	
Tincture - - - - -	1 in 4	5 to 30 minims	
<i>Ether</i> - - - - -	92 per cent.	20 to 60 minims	90
Compound Spirit - - -	1 in 3	30 to 120 minims	
Pure Ether - - - - -	—	—	
Spirit - - - - -	1 in 3	30 to 90 minims	
<i>Galls</i> - - - - -	—	—	176
Ointment - - - - -	80 grains in 1 oz.	—	
Ointment, with Opium -	32 grs. Op. in 1 oz.	—	
Tincture - - - - -	1 in 8	$\frac{1}{2}$ to 2 drams	
<i>Gentian Root</i> - - - -	—	—	123
Compound Infusion - - -	1 in 80	1 to 2 oz.	
Compound Tincture - - -	$1\frac{1}{2}$ oz. in 1 pint	$\frac{1}{2}$ to 2 drams	
Extract - - - - -	—	2 to 10 grains	
<i>Glycerine</i> - - - - -	—	1 to 2 drams	140
Suppositories - - - -	70 per cent.	—	
<i>Guaiacum Resin</i> - - -	—	10 to 30 grains	131
Ammoniated Tincture -	1 in 5	$\frac{1}{2}$ to 1 dram	
Mixture - - - - -	11 grains in 1 oz.	$\frac{1}{2}$ to 2 oz.	
<i>Hamamelis Bark</i> - - -	—	—	179
Tincture - - - - -	1 in 10	5 to 60 minims	
<i>Hamamelis Leaves</i> - - -	—	—	179
Liquid Extract - - - -	1=1	2 to 5 minims	
Ointment - - - - -	1 in 10	—	
<i>Henbane Leaves</i> - - -	—	—	147
Extract - - - - -	—	5 to 10 grains	
Juice - - - - -	—	$\frac{1}{2}$ to 1 dram	
Tincture - - - - -	1 in 8	$\frac{1}{2}$ to 1 dram	

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<i>Homatropine Hydrobromate</i> - - -	—	$\frac{1}{80}$ to $\frac{1}{50}$ grain	147
<i>Iodoform</i> - - -	—	$\frac{1}{2}$ to 3 grains	93
Ointment - - -	1 in 10	—	
Suppositories - - -	3 grains in each	—	
<i>Iodine</i> - - -	—	—	65
Inhalation - - -	(1 tinct. in 9)	—	
Liniment - - -	1 in $9\frac{1}{2}$	—	
Ointment - - -	16 grains in 1 oz.	—	
Solution - - -	1 in 20	—	
Tincture - - -	1 in 40	5 to 20 minims	
<i>Ipecacuanha Root</i> - - -	—	$\left\{ \begin{array}{l} \frac{1}{2} \text{ to } 2 \text{ grains} \\ \text{(Expect.)} \\ 18 \text{ to } 30 \text{ grs.} \\ \text{(Emetic)} \end{array} \right\}$	137
Compound Powder - - -	1 in 10 and 1 in 10		
	Opium	5 to 15 grains	
Lozenges - - -	$\frac{1}{4}$ grain in each	1 to 3	
Lozenges, with Morphine - - -	$\frac{1}{12}$ and $\frac{1}{30}$ Morph.	1 to 3	
Pill, with Squill - - -	1 in 23	5 to 10 grains	
Vinegar - - -	1 in 20	5 to 40 minims	
		$\left\{ \begin{array}{l} 5 \text{ to } 40 \text{ minims} \\ \text{(Expect.)} \\ 3 \text{ to } 6 \text{ drams} \\ \text{(Emetic)} \end{array} \right\}$	
Wine - - -	1 in 20		
<i>Iron</i> - - -	—	—	49
Aromatic Mixture - - -	1 in 32	1 to 2 oz.	
Pill - - -	1 gr. Carbonate	1 to 4	
	in each		
Wine - - -	1 in 20	1 to 4 drams	
<i>Ammonio Citrate of Iron</i> - - -	—	5 to 10 grains	56
Wine - - -	1 grain in 1 dram	1 to 4 drams	
<i>Arseniate of Iron</i> - - -	—	$\frac{1}{15}$ to $\frac{1}{2}$ grain	41
<i>Citrate of Iron and Quinine</i> - - -	1 Quinine in $6\frac{1}{4}$	5 to 10 grains	57
<i>Dialysed Solut. of Iron</i> - - -	5 per cent. Fe	10 to 30 minims	55
<i>Dried Sulphate of Iron</i> - - -	$2\frac{1}{2} = 4$	$\frac{1}{2}$ to 3 grains	51
<i>Granulated Sulphate of Iron</i> - - -	—	1 to 5 grains	52
<i>Hydrated Peroxide of Iron</i> - - -	—	5 to 30 grains	56
Plaster - - -	1 in 11	—	

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<i>Iodide of Iron</i> - - -	—	—	58
Pill - - - -	1 in 3½	3 to 8 grains	
Syrup - - - -	4·3 grains in 1 dram!	30 to 60 minims	
<i>Perchloride of Iron</i> - - -	—	—	54
Solution - - - -	1 to 3	10 to 30 minims	
Strong Solution - - - -	—	—	
Tincture - - - -	1 to 3	10 to 30 minims	
<i>Pernitrate of Iron</i> - - -	—	—	51
Solution - - - -	—	10 to 40 minims	
<i>Persulphate of Iron</i> - - -	—	—	55
Solution - - - -	—	—	
<i>Phosphate of Iron</i> - - -	—	5 to 10 grains	73
Syrup - - - -	1 grain in 1 dram	1 dram	
<i>Reduced Iron</i> - - - -	—	1 to 5 grains	50
Lozenges - - - -	1 grain in each	1 to 6	
<i>Saccharated Carbonate of Iron</i> - - -	—	5 to 30 grains	52
Pill - - - -	4 in 5	5 to 20 grains	
<i>Strong Sol. Acetate of Iron</i> - - -	—	1 to 8 minims	53
Solution - - - -	1 to 3	5 to 30 minims	
Tincture - - - -	1 to 3	5 to 30 minims	
<i>Subchloride of Iron</i> - - -	—	—	59
Syrup - - - -	—	½ to 1 dram	
<i>Sulphate of Iron</i> - - - -	—	1 to 5 grains	50
Compound Mixture - - -	2½ grains in 1 oz.	1 to 2 oz.	
Pill, with Aloes - - - -	1 in 7	5 to 10 grains	
<i>Tartarated Iron</i> - - - -	—	5 to 10 grains	57
<i>Jaborandi Leaves</i> - - - -	—	5 to 60 grains	119
Extract - - - -	—	2 to 10 grains	
Infusion - - - -	1 in 20	1 to 2 oz.	
Tincture - - - -	1 in 4	½ to 1 dram	
<i>Jalap</i> - - - -	—	10 to 30 grains	162
Compound Powder - - -	1 in 3	20 to 60 grains	
Extract - - - -	1 = 2	5 to 15 grains	
Tincture - - - -	1 in 8	½ to 2 drams	
<i>Jalap Resin</i> - - - -	—	2 to 5 grains	163
<i>Kino</i> - - - -	—	10 to 30 grains	177
Compound Powder - - -	3 in 4 (1 in 30 Opium)	5 to 20 grains	
Tincture - - - -	2 oz. in 1 pint	½ to 2 drams	

DRUGS AND PREPARATIONS.	STRENGTHS.	DOSES.	PAGE.
<i>Lead Acetate</i> - - -	—	1 to 4 grains	75
Compound Suppositories	3 grains Lead and 1 Opium in each	—	
Ointment - - -	12 grains in 1 oz.	—	
Pill, with Opium - -	3 in 4 (1 Opium in 8)	3 to 5 grains	
<i>Lead Subacetate</i> - -	—	—	76
Dilute Solution - -	1 in 80	—	
Glycerine - - -	—	—	
Ointment of Glycerine -	1 in 6½	—	
Solution - - -	24 per cent.	—	
<i>Lead Iodide</i> - - -	—	—	68
Ointment - - -	1 in 8	—	
Plaster - - -	1 in 9	—	
<i>Lead Oxide</i> - - -	—	—	74
<i>Lime</i> - - -	—	—	45
<i>Lime, Chlorinated</i> - -	33 per cent. Cl	—	48
Inhalation - - -	2 oz. in 1	—	
Solution - - -	1 in 10 (3 per cent. Cl)	—	
<i>Lime, Sulphurated</i> - -	50 per cent.	⅓ to 1 grain	85
<i>Magnesia, Light</i> - -	—	10 to 60 grains	70
<i>Magnesia, Heavy</i> - -	—	10 to 60 grains	70
<i>Magnesium Carbonate,</i> <i>Light</i> - - -	—	10 to 60 grains	69
<i>Magnesium Carbonate,</i> <i>Heavy</i> - - -	—	10 to 60 grains	69
Solution - - -	10 grains in 1 oz.	1 to 2 oz.	
<i>Magnesium Sulphate</i> -	—	60 grains to ½ oz.	68
Effervescing Sulphate -	1 in 2	¼ to 1 oz.	
Eneina - - -	1 oz. in 16 oz.	—	
<i>Male Fern</i> - - -	—	—	184
Liquid Extract - - -	—	15 to 30 minims	
<i>Mercury</i> - - -	—	—	59
Compound Ointment - -	1 in 4½	—	
Liniment - - -	1 in 6	—	
Ointment - - -	1 in 2	—	
Pill - - -	1 in 3	3 to 8 grains	
Plaster - - -	1 in 3	—	
Plaster, with Ammonia- cum - - -	1 in 5	—	

DRUGS AND PREPARATIONS.	STRENGTHS.	DOSES.	PAGE.
<i>Mercury—continued.</i>			
Suppositories - - -	5 grs. Ointment in each	—	
With Chalk - - -	1 in 3	3 to 8 grains	
<i>Acid Nitrate of Mercury</i>	—	—	65
<i>Ammoniated Mercury</i>	—	—	63
Ointment - - -	1 in 8	—	
<i>Perchloride of Mercury</i>	—	$\frac{1}{16}$ to $\frac{1}{8}$ grain	62
Solution - - -	$\frac{1}{2}$ grain in 1 oz.	$\frac{1}{2}$ to 2 drams	
Yellow Mercurial Lo- tion - - -	36 grains in 1 pint	—	
<i>Red Iodide of Mercury</i>	—	$\frac{3}{32}$ to $\frac{1}{8}$ grain	64
Ointment - - -	1 in 28	—	
Solution, with Arsenic Iodide - - -	10 per cent.	10 to 30 minims	
<i>Red Oxide of Mercury</i>	—	$\frac{1}{4}$ to 1 grain	61
Ointment - - -	1 in 8	—	
<i>Subchloride of Mercury</i>	—	$\frac{1}{2}$ to 5 grains	61
Black Mercurial Lo- tion - - -	3 grains in 1 oz.	—	
Compound Pill - - -	1 in 5	5 to 10 grains	
Ointment - - -	1 in 6 $\frac{1}{2}$	—	
<i>Yellow Oxide of Mercury</i>	—	—	60
<i>Morphine Acetate</i>	—	$\frac{1}{8}$ to $\frac{1}{2}$ grain	114
Hypodermic Injection -	1 in 10	1 to 5 minims	
Solution - - -	1 in 100	10 to 60 minims	
<i>Morphine Bimeconate So- lution</i> - - -	1 $\frac{1}{4}$ per cent.	5 to 40 minims	115
<i>Hydrochlorate of Mor- phine</i> - - -	—	$\frac{1}{8}$ to $\frac{1}{2}$ grain	113
Lozenges - - -	$\frac{3}{16}$ grain in each	1 to 6	
Lozenges, with Ipecac.	$\frac{3}{16}$ grain in each	1 to 6	
Solution - - -	1 in 100	10 to 60 minims	
Suppositories - - -	$\frac{1}{2}$ grain in each	—	
Suppositories, with Soap - - -	$\frac{1}{2}$ grain in each	—	
<i>Sulphate of Morphine</i>	—	$\frac{1}{4}$ to $\frac{1}{2}$ grain	115
Solution - - -	1 in 100	10 to 60 minims	
<i>Myrrh</i> - - -	—	—	130
Pill, with Aloes - - -	1 in 6	5 to 10 grains	
Tincture - - -	1 in 8	$\frac{1}{2}$ to 1 dram	

DRUGS AND PREPARATIONS.	STRENGTHS.	DOSES.	PAGE.
<i>Nitrate of Pilocarpine</i> -	—	$\left\{ \begin{array}{l} \frac{1}{20} \text{ to } \frac{1}{2} \text{ grain} \\ \text{Mouth.} \\ \frac{1}{10} \text{ to } \frac{1}{3} \text{ grain} \\ \text{Hypod.} \end{array} \right\}$	120
<i>Nitroglycerine</i> -	—	—	97
Solution -	1 in 100	$\frac{1}{2}$ to 2 minims	
Tablets -	$1\frac{1}{10}$ grain in each	1 to 2	
<i>Nux Vomica</i> -	—	—	141
Extract -	15 per cent. alkaloids	$\frac{1}{4}$ to 1 grain	
Tincture -	1 grain alkaloids in 1 oz.	10 to 20 minims	
<i>Opium</i> -	—	$\frac{1}{2}$ to 3 grains	108
Compound Powder -	1 in 10	2 to 5 grains	
Confection -	1 in 40	5 to 20 grains	
Enema -	$\frac{1}{2}$ dram Tincture in each	—	
Extract -	1=2	$\frac{1}{2}$ to 1 grain	
Liniment -	1 (Tincture) in 2	—	
Liquid Extract -	1 in 10	10 to 40 minims	
Lozenges -	$\frac{1}{6}$ grain in each	1 to 2	
Ointment, with Galls -	32 grains in 1 oz.	—	
Pill (Saponis) -	1 in 6	3 to 5 grains	
Plaster -	1 in 10	—	
Powder, with Chalk -	1 in 40	10 to 40 grains	
Tincture -	33 grains in 1 oz.	5 to 40 minims	
Wine -	1 in 10	10 to 40 minims	
<i>Paraldehyde</i> -	—	30 to 90 minims	95
<i>Phenacetin</i> -	—	5 to 10 grains	99
<i>Phenazone (Antipyrin)</i> -	—	3 to 20 grains	99
<i>Phosphorus</i> -	—	$\frac{1}{40}$ to $\frac{1}{20}$ grain	71
Phosphorized Oil -	1 in 100	5 to 10 minims	
Pill -	$\frac{1}{30}$ grain in 3 grs	2 to 4 grains	
<i>Physostigma Bean</i> -	—	1 to 4 grains	121
Extract -	—	$\frac{1}{10}$ to $\frac{1}{4}$ grain	
<i>Physostigmine</i> -	—	—	124
Lamella -	$1\frac{1}{1000}$ grain in each	—	
<i>Podophyllum Rhizome</i> -	—	—	163
<i>Podophyllin Resin</i> -	—	$\frac{1}{4}$ to 1 grain	161
Tincture -	1 grain in 1 dram	15 to 60 minims	
<i>Potash, Caustic</i> -	—	—	78
Solution -	27 grains in 1 oz.	15 to 60 minims	

DRUGS AND PREPARATIONS.	STRENGTHS.	DOSES.	PAGE.
<i>Potash, Sulphurated</i> -	—	—	85
Ointment - - -	30 grains in 1 oz.	—	
<i>Potassium, Acid Tartrate</i> -	—	20 to 60 grains	79
of - - -	—	10 to 40 grains	76
<i>Potassium Bicarbonate</i> -	—	—	
Effervescing Solution -	30 grs. in 1 pint	—	
<i>Potassium, Bromide of</i> -	—	5 to 30 grains	44
<i>Potassium, Chlorate of</i> -	—	10 to 30 grains	77
Lozenges - - -	5 grains in each	1 to 6	
<i>Potassium, Iodide of</i> -	—	2 to 20 grains	67
Liniment, with Soap -	54½ grains in 1 oz.	—	
Ointment - - -	64 grains in 1 oz.	—	
<i>Permanganate of Potas.</i> -	—	1 to 5 grains	79
Solution - - -	4 grains in 1 oz.	2 to 4 drams	
<i>Potassium, Sulphate of</i> -	—	15 to 60 grains	78
<i>Quassia Wood</i> - - -	—	—	121
Extract - - -	—	3 to 5 grains	
Infusion - - -	1 in 80	1 to 2 oz.	
Tincture - - -	1 in 27	1 to 2 drams	
<i>Quinine Hydrochlorate</i> -	—	1 to 10 grains	136
Tincture - - -	1 grain in 1 dram	½ to 2 drams	
<i>Quinine, Sulphate of</i> -	—	1 to 10 grains	135
Ammoniated Tincture -	1 gr. in 1 dram	½ to 2 drams	
Wine - - -	1 grain in 1 oz.	½ to 1 oz.	
<i>Resin</i> - - -	—	—	171
Ointment - - -	4 in 15	—	
Plaster - - -	2 in 19	—	
<i>Rhubarb Root</i> - - -	—	5 to 20 grains	165
Compound Pill - - -	1 in 4	5 to 10 grains	
Compound Powder -	2 in 9	20 to 60 grains	
Extract - - -	—	5 to 15 grains	
Infusion - - -	1 in 40	1 to 2 oz.	
Syrup - - -	—	1 to 4 drams	
Tincture - - -	—	{ 1 to 2 drams } (Stomachic) { ½ to 8 drams } (Purgative)	
Wine - - -	33 grains in 1 oz.	1 to 2 drams	
<i>Salicine</i> - - -	—	3 to 20 grains	137
<i>Santonin</i> - - -	—	2 to 6 grains	185
Lozenges - - -	1 grain in each	1 to 6	

DRUGS AND PREPARATIONS.	STRENGTHS.	DOSES.	PAGE.
<i>Senega Root</i> - - -	—	—	139
Infusion - - -	1 in 20	1 to 2 oz.	
Tincture - - -	1 in 8	$\frac{1}{2}$ to 2 drams	
<i>Senna, Alexandrian</i> - - -	—	10 to 30 grains	166
<i>Senna, Indian</i> - - -	—	10 to 30 grains	167
Compound Mixture -	1 in 5 Mag. Sulph.	1 to $1\frac{1}{2}$ oz.	
Confection - - -	1 in 11	1 to 2 drams	
Infusion - - -	1 in 10	1 to 2 oz.	
Syrup - - -	—	1 to 4 drams	
Tincture - - -	1 in 8	2 to 8 drams	
<i>Silver Nitrate</i> - - -	—	$\frac{1}{6}$ to $\frac{1}{3}$ grain	38
Mitigated Caustic -	1 in 3	—	
Toughened Caustic -	95 per cent.	—	
<i>Soda, Caustic</i> - - -	—	—	82
Solution - - -	18·8 grains in 1 oz.	10 to 60 minims	
<i>Soda, Chlorinated</i> - - -	—	—	48
Poultice - - -	2 oz. in each	—	
Solution - - -	2·5 per cent.	—	
	Chlorine	10 to 20 minims	
<i>Sodium, Arseniate of</i> -	—	$\frac{1}{16}$ to $\frac{1}{8}$ grain	41
Solution - - -	1 in 100	5 to 10 minims	
<i>Sodium, Benzoate of</i> -	—	10 to 30 grains	174
<i>Sodium, Bicarbonate of</i> -	—	10 to 60 grains	80
Effervescing Solution -	30 grs. in 1 pint	—	
Lozenges - - -	5 grains in each	1 to 6	
<i>Sodium, Bromide of</i> -	—	10 to 30 grains	45
<i>Sodium, Hypophosphite of</i> -	—	5 to 10 grains	74
<i>Sodium, Iodide of</i> - -	—	3 to 10 grains	67
<i>Sodium, Nitrite of</i> - -	—	2 to 5 grains	82
<i>Sodium, Phosphate of</i> -	—	$\frac{1}{4}$ to 1 oz.	73
Effervescing - - -	1 in 2	$\frac{1}{4}$ to $\frac{1}{2}$ oz.	
<i>Sodium, Salicylate of</i> -	—	10 to 30 grains	103
<i>Sodium, Sulphate of</i> -	—	$\frac{1}{4}$ to 1 oz.	82
Effervescing - - -	1 in 2	$\frac{1}{4}$ to $\frac{1}{2}$ oz.	
<i>Spirit of Nitrous Ether</i> -	—	$\frac{1}{2}$ to 2 drams	97
Proof Spirit - - -	54 per cent. Alc.	—	90
Rectified Spirit - -	84 per cent. Alc.	—	89
<i>Squill Bulb</i> - - -	—	1 to 3 grains	152
Compound Pill - - -	1 in 5	5 to 10 grains	
Oxymel - - -	—	$\frac{1}{2}$ to 1 dram	
Pill, with Ipecac. -	1 in 7 (1 in 23 $\frac{1}{2}$ Opium).	5 to 10 grains	

DRUGS AND PREPARATIONS.	STRENGTHS.	DOSES.	PAGE.
<i>Squill Bulb—continued.</i>			
Syrup - - -	—	$\frac{1}{2}$ to 1 dram	
Tincture - - -	1 in 8	10 to 30 minims	
Vinegar - - -	1 in 8	15 to 40 minims	
<i>Stramonium Leaves</i> - - -	—	—	149
<i>Stramonium Seeds</i> - - -	—	—	148
Extract - - -	—	$\frac{1}{4}$ to $\frac{1}{2}$ grain	
Tincture - - -	1 in 8	10 to 30 minims	
<i>Strophanthus Seeds</i> - - -	—	—	151
Tincture - - -	1 in 20	2 to 10 minims	
<i>Strychnine</i> - - -	—	$\frac{1}{36}$ to $\frac{1}{12}$ grain	142
Solution - - -	1 in 100	5 to 10 minims	
<i>Sublimed Sulphur</i> - - -	—	20 to 60 grains	83
Confection - - -	2 in 5	1 to 2 drams	
Lozenges - - -	5 grains in each	1 to 6	
Ointment - - -	1 in 5	—	
<i>Sulphonal</i> - - -	—	15 to 40 grains	96
<i>Sulphur, Precipitated</i> - - -	—	20 to 60 grains	84
<i>Turpentine</i> - - -	—	$\left\{ \begin{array}{l} 10 \text{ minims to} \\ 4 \text{ drams} \end{array} \right\}$	170
Acetic Liniment - - -	4 in 9	—	
Confection - - -	1 in 4	1 to 2 drams	
Enema - - -	1 oz. in each	—	
Liniment - - -	16 in 21	—	
Ointment - - -	8 in 17	—	
<i>Zinc, Chloride of</i> - - -	—	—	85
Solution - - -	366 grains in 1 oz.	—	
<i>Zinc, Oxide of</i> - - -	—	2 to 10 grains	86
Ointment - - -	80 grains in 1 oz.	—	
<i>Zinc, Sulphate of</i> - - -	—	$\left\{ \begin{array}{l} 1 \text{ to 3 grains} \\ \text{(Tonic)} \\ 2 \text{ to 10 grains} \\ \text{(Emetic)} \end{array} \right\}$	86

THE END.

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